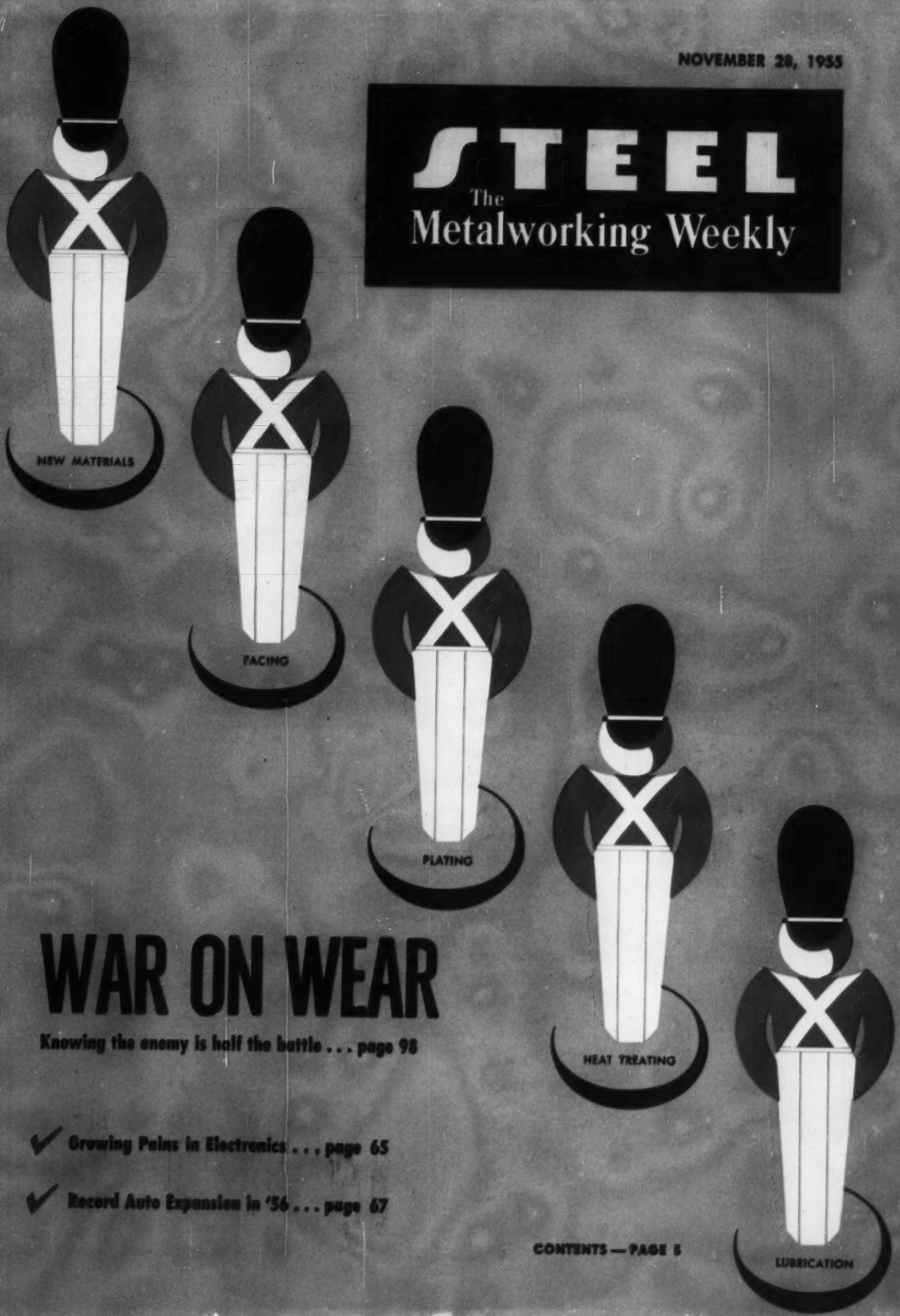
NOVEMBER 28, 1955

STEEL
The Metalworking Weekly



WAR ON WEAR

Knowing the enemy is half the battle . . . page 98

✔ **Growing Pains in Electronics . . . page 65**

✔ **Record Auto Expansion in '56 . . . page 67**

CONTENTS — PAGE 5

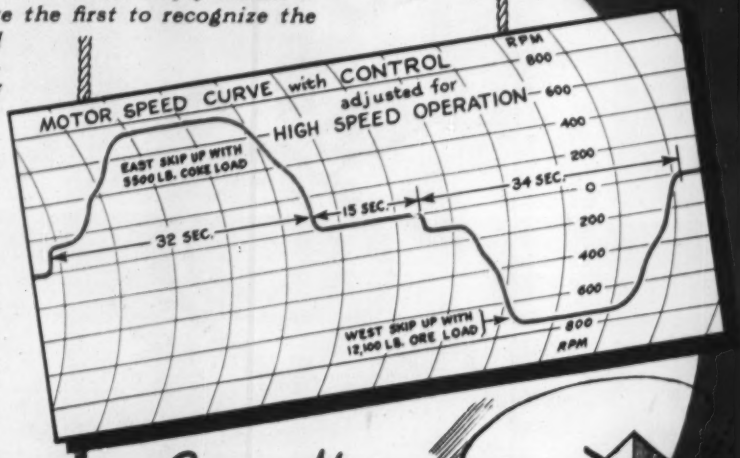
4 BIG ADVANTAGES IN SKIP HOIST OPERATION WITH EC&M LINE-ARC CONTACTOR CONTROL

1 *Adjustable Control* allowing up to double the running speed on the straight part of the track for reduced charging-time. Full field strength and maximum torque for acceleration, and at slow-down for accurate stopping—either with an empty bucket or capacity ore load. (*EC&M were the first to recognize the advantages of adjustable field control to speed up the skip-hoist on the straight part of the track.*)

2 *Low Initial Investment*—and low stand-by renewal part inventory.

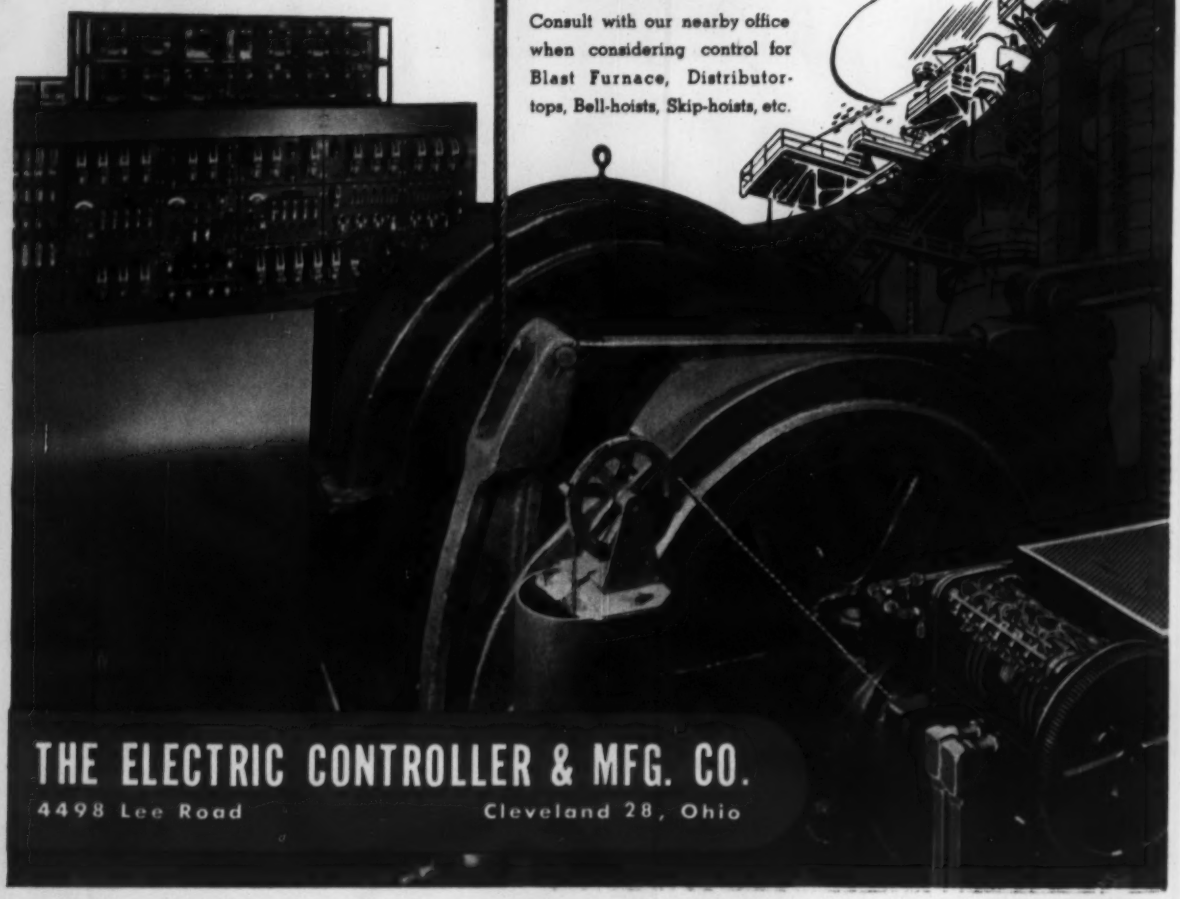
3 *Simple Construction Easily Inspected*—with minimum labor and up-keep expense.

4 *Safe, Smooth Operation* under all conditions of load. The accompanying curve shows this clearly and is typical of the economical, smooth and efficient operation obtained with this control.



Consult

Consult with our nearby office when considering control for Blast Furnace, Distributor-tops, Bell-hoists, Skip-hoists, etc.



THE ELECTRIC CONTROLLER & MFG. CO.

4498 Lee Road Cleveland 28, Ohio

Tool Steel Topics

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

Export Distributor: Bethlehem Steel Export Corporation

Notching Die Made of Bearcat Gives 7 Times Greater Output

An interesting item being manufactured in the southeastern part of the country is a windshield garnish molding for a popular make of automobile. The molding is produced from cold-rolled steel, 0.020 in. thick. It is formed by a notching die, hardened to Rockwell C 56-58.

With the grades of shock-resisting tool steel formerly used for the die, a maximum of 1400 pieces was produced before breakage occurred. Because of the severity of the application, this was considered good production even though it necessitated a change of die about five times daily.

After studying the operation, we suggested a change to Bearcat tool steel. "Bearcat is a super shock-resisting grade," we said. "We're sure it will last longer in a tough job like this, and so save you money. Why don't you give it a try?"

So Bearcat was put to work. The dies made of Bearcat have been giving a good account of themselves by producing up to 10,000 pieces before being replaced. That's seven times the output obtained from the dies before changing to Bearcat.

Surprising? Not at all. Bearcat is continually chalking up new performance records in a variety of interesting applications. Bearcat is a superior, general-purpose grade of air-hardening tool steel. It has exceptional resistance to shock, and is also well suited for uses where hot-work properties and easy machining are essential. Bearcat can be used in a wide range of applications such as punches, master hobs, engraving dies, and short-run dies used in cold-forming, blanking and bending.

The best way to determine how good a job Bearcat can do is to put it to work on some difficult job in your shop. You can order Bearcat through your local Bethlehem tool-steel distributor. We also carry it in stock in our mill depot.

BETHLEHEM TOOL STEEL ENGINEER SAYS:

Retemper Tools After Grinding

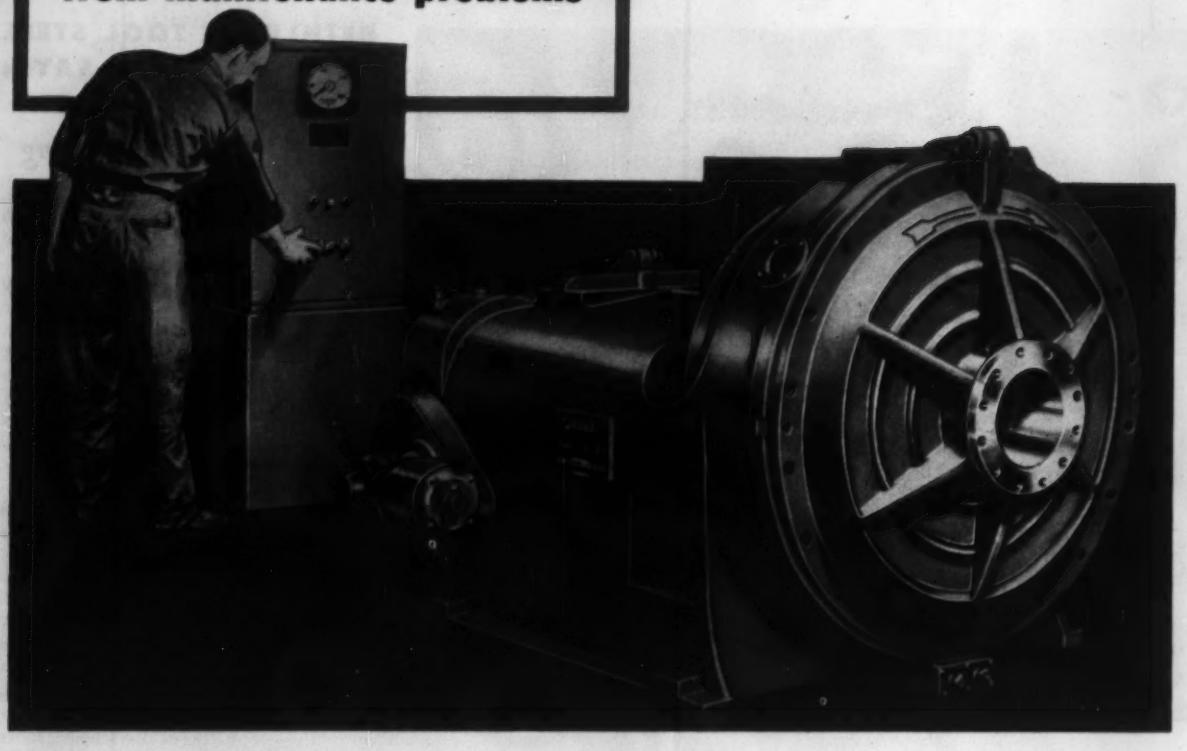
No matter how carefully performed, grinding operations on hardened tools always generate residual stresses in the tools. But as tools already contain residual stresses after they are quenched, any additional stresses are likely to cause trouble. Now, if the combined stresses are sufficiently high, cracking may occur during grinding, which makes it easy to locate the source of the trouble. But if the combined residual stresses are just below the ultimate strength of the steel, cracks will not appear for the time being. Instead, the tools are apt to crack subsequently, at the application of normal stresses set up either in handling, or in using the tools.

To avoid this difficulty, we recommend reducing the stresses to a safe level by retempering the tools immediately after grinding, using a temperature which is slightly lower than the original tempering temperature. With many toolmakers, retempering after grinding is routine procedure, a form of insurance, more or less, against running into trouble.

BLANKING DIE FOR HANDBAG HANDLES

This blanking die, used by Westberg Tool and Manufacturing Company, Bridgeport, Conn., for the manufacture of handbag handles, has BTR (Bethlehem Tool Room) tool steel in both the die and the punch. BTR is our long-wearing, general-purpose, manganese-chromium-tungsten grade of oil-hardening tool steel.

SKF-Equipped Jones Double-D Refiners assure complete freedom from maintenance problems



There's good news for paper mills in the line of Double-D pressurized double-disc refiners manufactured by E. D. Jones & Sons Company, Pittsfield, Mass. Twelve leading paper mills, where Double-D units have been in operation since their development two years ago, report complete lack of maintenance problems—and highly efficient and economical refining operation.

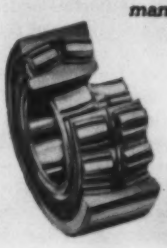
Double-D refiners are completely pressurized units with pulp flow through the machines almost entirely independent of the disc design. This feature makes it possible to:

1. Vary the flow-through rate within wide limits without changing disc design.
2. Change the type of stock treatment without changing discs.
3. Change the consistency of the stock to suit the particular needs of the mill without any other change, except for regulating the power.
4. Produce refined pulp with no aeration.

Contributing to the dependability of the Double-D refiner, by keeping friction at a minimum, are SKF Spherical Roller Bearings. These spherical bearings—like all SKF bearings—are designed, engineered and manufactured to meet the industry's most rigid performance requirements.

When you *design* paper mill machinery, look confidently to SKF to help you put *the right bearing in the right place.*

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA., *manufacturers of* SKF *and* HESS-BRIGHT® *bearings.*



SKF®

BALL AND ROLLER BEARINGS

ASSEMBLIES . . . SLINGS . . . WIRE ROPE

made for better service and economy

WIRE ROPE ASSEMBLIES. Macwhyte "Safe-Lock" Wire Rope Assemblies are made in a wide range of sizes. They are made to order in length, strength, and flexibility desired. Terminals are permanently attached to one or both ends. There are many standard types.

"Safe-Lock" Assemblies are widely used for machine parts, controls, and operating devices. They are made to both industrial and aircraft standards and designed to meet special operating conditions as required. *Ask for Catalog 5201.*

WIRE ROPE SLINGS. Macwhyte makes hundreds of sizes and types of wire rope slings. Custom designs made to meet special needs. *Send for Catalog S-8.*

WIRE ROPE. A thousand and one types, sizes, and grades of wire rope are made by Macwhyte to assure you of a *right* rope for each equipment need. *Ask for Catalog G-16.*

MACWHYTE

WIRE ROPE · SLINGS · WIRE ROPE ASSEMBLIES

11 TIMES THE SERVICE

Steel mill was using rag roll as pinch roll on a shear unit. It lasted about three months on the job. Oil, heat, cutting and pressure contributing toward short life.

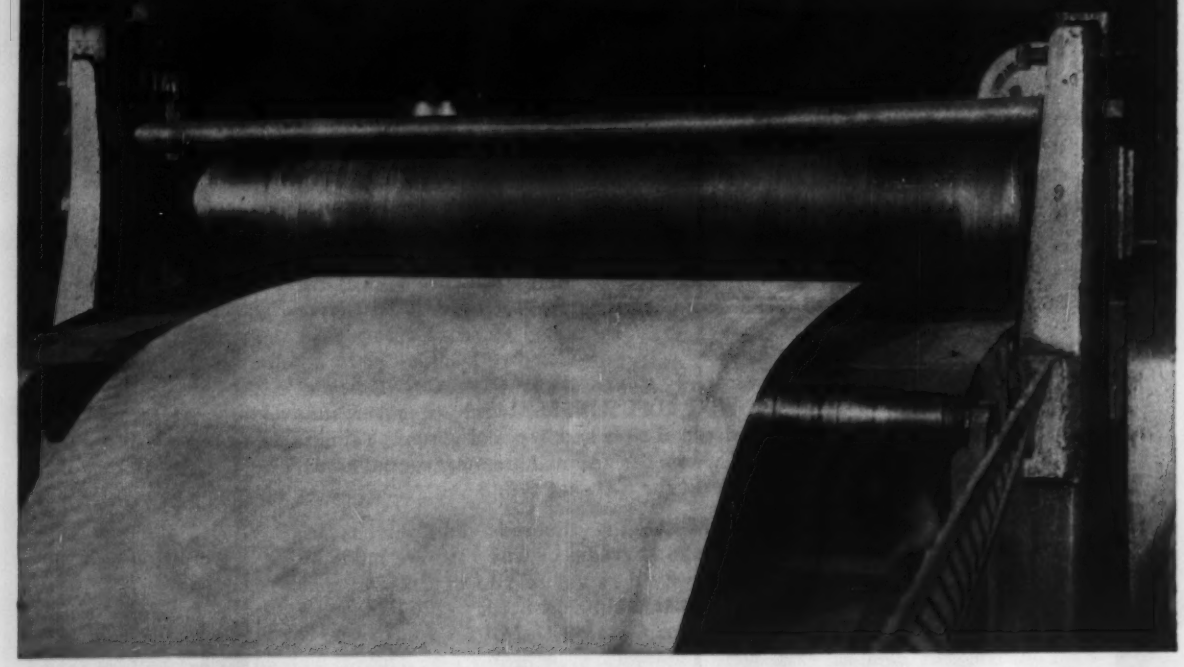
The G.T.M.—Goodyear Technical Man—recommended using a rubber-covered roll, specified compound and thickness to be used in covering the roll. This roll served 33 months—*11 times the service at a slightly lower original cost.*

Why not discuss your roll covering problems—or procurement of complete rolls—with the G.T.M., or write Goodyear, Industrial Products Div., Akron 16, Ohio.

GOODYEAR INDUSTRIAL PRODUCTS

GY-Specified TYPICAL ROLL APPLICATIONS FOR STEEL MILLS

PROCESSES	TYPES OF ROLLS	
Electrolytic Tin Line	Scrubber	Slitter
Carbon Steel Pickling	Wringer	Tension
Continuous Galvanizing Line	Pinch	Directional
Continuous Annealing Line	Hold-down	Carrying
		Coating



YOUR GOODYEAR DISTRIBUTOR *can quickly supply you with Hose, Flat Belts, V-Belts, Packing, Tank Lining, Rubber-Covered Rolls. Look for him in the yellow pages of your Telephone Directory under "Rubber Products" or "Rubber Goods."*

We think you'll like
THE GOODYEAR TELEVISION PLAYHOUSE
every other Sunday—NBC TV Network

GOODYEAR

THE GREATEST NAME IN RUBBER

STEEL
The Metalworking Weekly

NOVEMBER 28, 1955
Vol. 137 No. 22

METALWORKING OUTLOOK, 59

The Editor's Views, 63

Growing Pains in Electronics, 65
Problems: Diversification, financing, market research

Record Auto Expansion in 1956, 67
Automakers will spend $1.8 billion next year

Management at Work, 75
Crane's Magos: Engineering Executive

A-Bombing Menaces Metalworking, 66

Aluminum Extrusion To Double by 1960, 69

Saving in Heating, 70

Western States Gain as Steel Users, 71

Uptrend in Rubber, 76

Lubrication Goes Scientific, 77

Windows of Washington, 72
Mirrors of Motordom, 79
The Business Trend, 83
Men of Industry, 87
New Products, 125
Behind the Scenes, 6
Letters to the Editors, 10
Calendar of Meetings, 27
Machine Topics, 104
New Literature, 130

TECHNICAL OUTLOOK, 97

War on Wear, 98
Knowing the enemy better helps the fight for wear resistance

Keeping Ahead of Extrusion, 102
Big presses at Halethorpe ease the aluminum squeeze

Abrasive Blasts Scale from Carbon Strip, 106
Mechanical scaler saves on space on pickling costs

Heat Treating Ductile Iron, Part II, 109

Cyanide Recovery Pays Double Dividend, 117

MARKET OUTLOOK, 135

Steel Operations, 135
Price Comparisons, 136
Nonferrous Roundup, 138
Nonferrous Prices, 140
Steel Prices, begin 142
Scrap Prices, 162

Editorial & Business Staffs, 16. Advertising Index, 167. Editorial Index available semiannually. STEEL also is indexed by Engineering Index Inc., 29 W. 39th St., New York 18, N.Y.

Published every Monday by The Penton Publishing Co., Penton Bldg., Cleveland 13, O. Subscription in the United States and its possessions, Canada, Mexico, Cuba, Central and South America, one year, $7.50; two years, $15; all other countries, one year, $20. Single copies (current issues), 50 cents. Metalworking Yearbook issue, $2. Accepted as controlled circulation publication at Cleveland.
Copyright, 1955, The Penton Publishing Co.

Here's the Magic
SKETCHFORMING SET

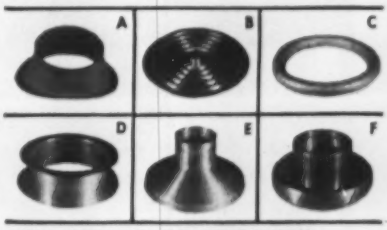
THAT SAVES YOU

DAYS AND DOLLARS . . .

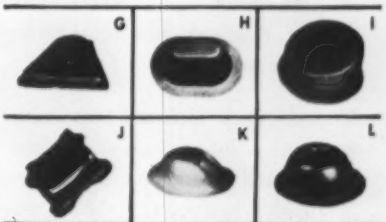
Makes clean copies instantly, without carbon paper. Keyed block background in light grey aids sketching and permits quick reference to details when discussing by telephone. Write Roland Teiner, Everett 49, Mass. for free copies. Use them to request quotations, order models or to develop cost reducing engineering changes.

TRY TEINER

for all fabrications including metal spinning, spinforming, hydroforming, welding and finishing.



METAL SPINNING AND SPINFORMING:
Typical items: A—Aircraft detail; B—Decorative cover; C—Retainer ring; D—Winding reel; E—Electronic shield; F—Electrical detail.



HYDROFORMING:
Typical items: G—Aircraft detail; H—Spindle cover; I—Aircraft detail; J—Auto bracket; K—Light reflector; L—Air cleaner.

ROLAND TEINER Company, Inc.
DEPT. 22 - 134 TREMONT STREET, EVERETT 49, MASS.
Telephone EVerett 7-7800
ENGINEERING REPRESENTATIVES IN PRINCIPAL CITIES

Don't junk your old boring mill just because it has grown wobbly and loose. Now is the time to have your outdated machine tools returned to their original performance levels through Simmons Engineered Rebuilding—at half the cost of new equipment

Engineered Rebuilding by Simmons *unconditionally guarantees* that your machine tools will equal or exceed manufacturers' original specifications.

And, through modernization, Simmons is adapting old machines to high-speed, high-precision production that was unheard of when the tools were new.

Today: look into the important economies in production, maintenance, and liberal tax allowances available when you turn the old machines in your plant into precision equipment for today's production!

Write, wire, or phone...

Simmons Machine Tool Corp.
1755 N. Broadway, Albany 1, N. Y.

Unconditional guarantee... our standard since 1910

behind the scenes

Wear and Tear

Everything in the world is assembled from raw material that consists of a fixed number of elements. Doughnuts, fishhooks and men come from the same master mix, and even diamonds and halitosis are distant cousins by reason of a carbon relationship. And everything in the world, no matter how it is assembled, is striving every minute to break up into its original components. Even man, a creature highly esteemed by most of us, is little more than a biological respite between genes and disintegration. Indeed, Leonardo Da Vinci once made a note that man, in his opinion, was little more than a passageway for food.

In the face of evidence that disintegration, dissolution and wear are the inevitable partners of all things under the sun, Associate Editor Van Caldwell sat down to consider what might be done about it. "Wear," he said, "is a fact of life. Nobody seriously considers getting along without it. The problem is to get along *with* it."

So Van tore into the problem, and after six months of research, he began to appreciate the obstacles. He felt like a man attempting to stuff an adult and vigorous octopus into a milk bottle. There were so many points to consider, he couldn't pin them all down. Like love, wear is a many splendored thing; it manifests itself in abrasion, friction, impact, vibration, corrosion and heat, and if you wish to fight these things in an effort to preserve and maintain your equipment and inventories, read "War on Wear," (page 98).

Booming Electronics

What are electronics doing these days? (Or should it be what *is* electronics doing? Reminds us of the editor who bawled out a reporter for confusing compound subjects and predicates. "Did you dig up any news today?" he bellowed. "No sir," said the reporter. "Not a single new.") Well, electronics are—or is—big news today. Associate Editor Stan Stewart investigated this booming industry and reports his findings on page 65. Stan says that electrons constitute cathode rays and beta rays, and are emitted by all hot bodies, but the only rays that really interested him were the hoorays emitted by manufacturers and distributors of electronics. Fifteen years ago the business was scarcely worth bothering about; this year its sales will reach about $9.5 billion!

Pssst! Income Tax!

We hate to be the first to remind you that income tax time will soon be upon us; well, it *seems* to creep upon us mighty rapidly. However, before you sit down to do battle with those gobbledygook directions, you migh do well to investigate a *New Dictionary of Income Tax Terms*, published by Commerce Clearing House, Chicago. This handy aid to sanity contains definitions of over 200 words and phrases which come out of the revenue code, or have developed special meanings—like "spin-off," "downstairs merger," "sum of the years digits," "declining balance," "away from home" and "involuntary conversion."

The tax significance of such phrases is clearly explained in the new dictionary. By the time you have mastered the definitions, all you have to do is figure out how to raise the money to pay the taxes.

The Bored Farmer

Miller the driller was a man who never gave up when he started a job. Failing on his first attempt to find oil under Mt. Olympus, down in New Zealand, he bored straight on through the center of the earth. When Miller's drill pushed through on the opposite side of the earth, a farmer who had risen early rose again, because the bit came right up through the seat of his chair.

Now, the farmer swore in alarm, and sent a message to his city cousin, who lived in the largest town in the district, about 60 miles away. What language did the farmer speak, and where did his cousin live?

Shrdlu

(Metalworking Outlook—Page 59)

IMPORTANT NEW BULLETIN

describes space-saving, weight-saving

MAIL THIS COUPON FOR YOUR *FREE* COPY...

To CENTURY ELECTRIC COMPANY CE-36
1806 Pine Street, St. Louis 3, Mo.

Please send New Bulletin 6-1P1 to:

Name..... Title.....

Company.....

Address.....

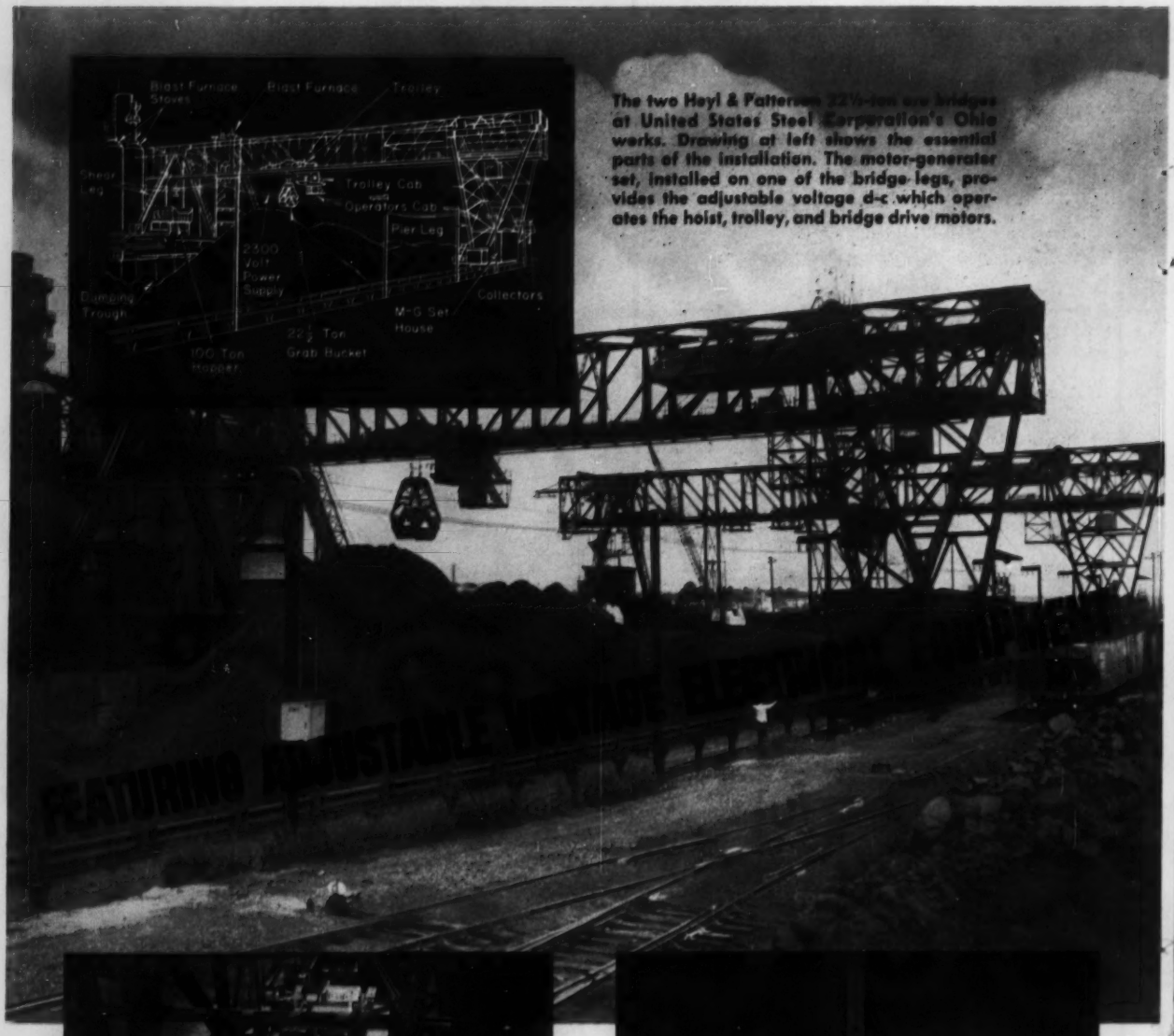
City..... Zone..... State.....

Performance-Rated© MOTORS
⅛ to 400 H.P.

CENTURY ELECTRIC COMPANY

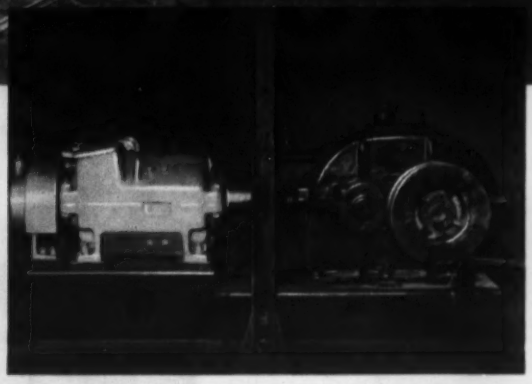
1806 Pine St., St. Louis 3, Mo. • *Offices and Stock Points in Principal Cities*

New ore bridges for U.S. Steel's



The two Heyl & Patterson 22½-ton ore bridges at United States Steel Corporation's Ohio works. Drawing at left shows the essential parts of the installation. The motor-generator set, installed on one of the bridge legs, provides the adjustable voltage d-c which operates the hoist, trolley, and bridge drive motors.

Two 250-hp hoist engine drive motors hoist, open and close the bucket. Outboard of these motors are two identical Elliott motors which drive the trolley along its rails.



Each truck has two gravity-set rail clamps, like the one shown here, to augment the motor brakes in immobilizing the giant 1300-ton structure on its track. A 6½-hp Elliott mill type motor releases clamp.

Ohio Works...

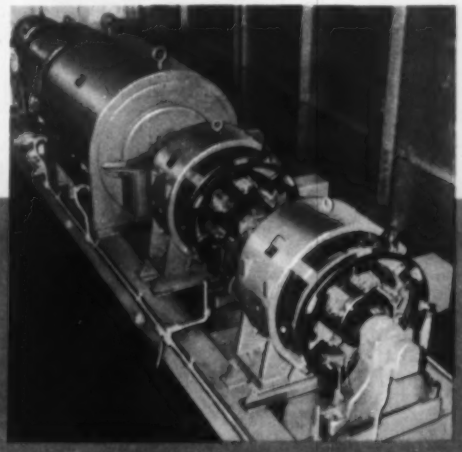
When increased blast furnace capacity required the installation of two new ore bridges at the United States Steel Corporation's Ohio Works, Youngstown, Ohio, designers incorporated all the most modern innovations and features. By using adjustable voltage electrical control, bridge motions are controlled more precisely and smoothly. Speed control is improved and hoisting speed is increased. In addition, greater bridge capacity is obtained without increase in the size or number of motors by operating the motors at near double-rated voltage and double speed. As the original power supply is a-c, no increase in d-c capacity of the plant is necessary. Other important advantages are less maintenance and less over-all power consumption.

BY ELLIOTT

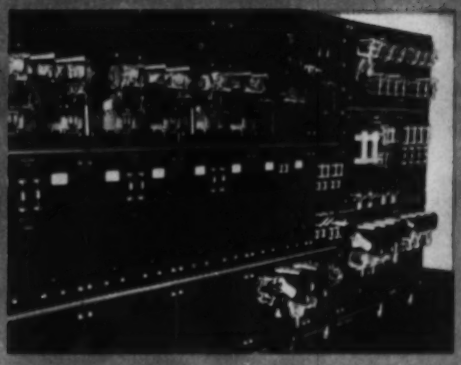
All major electrical equipment, including controls, was furnished by Elliott Company. Both Elliott engineers and Elliott equipment are thoroughly at home in steel mill operations. Take advantage of this experience. Consult your local Elliott field engineer or write Elliott Company, Crocker-Wheeler Division, Jeannette, Pa. for full information.

ELLIOTT Company

STEAM TURBINES • MOTORS • GENERATORS • DEAERATING HEATERS • EJECTORS • CONDENSERS • CENTRIFUGAL COMPRESSORS • TURBOCHARGERS • TUBE CLEANERS • STRAINERS

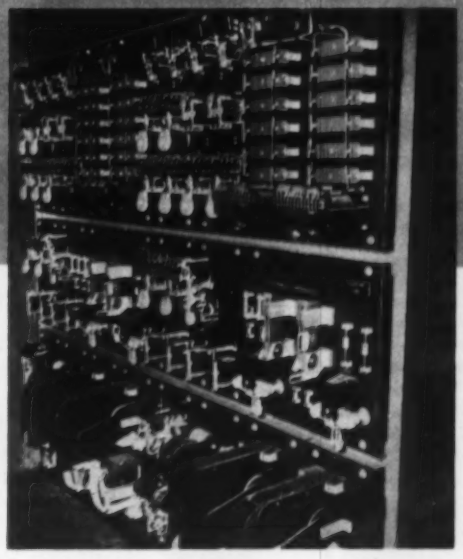


Elliott motor-generator set which converts incoming 2300-volt, 25-cycle power supply to adjustable voltage d-c. Two 250-kw generators in foreground supply bucket hoist and bridge travel motors. Larger 400-kw generator, in rear, supplies power for motors which drive the trolley.



Control for the generators, located in the enclosed, pressurized motor-generator house.

One of the pairs of two-rail trucks which support the pier leg of the bridge. A 100-hp Elliott mill type motor, equipped with brake, drives each truck.



Part of the adjustable voltage control equipment furnished by Elliott for each bridge. This is a portion of the motor control installed in the trolley cab.

YOU *Can* AVOID DIE COSTS COMPLETELY!

On Your Next **STAMPING ORDER**

Yes, you can — but it's not *necessarily* the best thing for you.

You want the lowest unit cost — *for the life of the part*, including re-runs. It may well be that our **Machine-Cut Method**, with no die cost, does work out best.

Or, it might better be our **Short Run Method**, using economical blanking dies and stock punches.

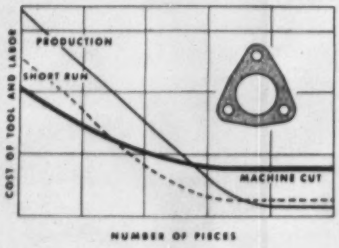
Sometimes, even with very short runs, it pays to use our **Production Method** with a standard die or our own surprisingly inexpensive Hecht-type tool.

In *any* case, the decision is a technical one based on many factors, not just length of run. You save money when the correct decision is made.

WE USE ALL THREE METHODS — LET US MAKE AN IMPARTIAL DECISION FOR YOU

For example, take the part illustrated. From 1-65 parts, our Machine-Cut Method is most economical. At 65 parts, the Short-Run Method is best until, at 7,000 units, the standard Production Method is most satisfactory.

These breaking points as charted vary drastically with every stamping, but the general principle remains the same.



LAMINATED SHIM COMPANY, INC.

Manufacturers of ALL TYPES OF SHIMS

STAMPINGS DIVISION

ONE PIECE OR ONE MILLION

STAMPINGS DIVISION, LAMINATED SHIM COMPANY
3411 Union Street, Glenbrook, Conn.

Gentlemen:

Please rush me my free copy of "SERVICE IN STAMPINGS"—the 12-page, illustrated booklet full of helpful facts on the economical buying of stampings.

NAME _____ TITLE _____

COMPANY _____

STREET _____

CITY _____ ZONE _____ STATE _____

LETTERS TO THE EDITORS

'Pricing' Editorial Praised

Your editorial, "Why Cut Prices?" (Nov. 14, page 57), is one of the best on the subject of pricing that I have seen. Please rush 100 reprints.

J. C. Sears
Executive Secretary
American Gear Mfrs. Association
Washington

Article Ideas Adopted

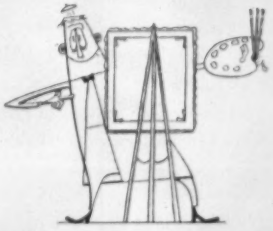
Your 1955 Program for Management series was brought to our attention through the eighth article, "Value Analysis: Equal or Better Performance at Lower Costs" (Sept. 19, page 101).

I would appreciate receiving two copies of this article and one copy of the others in the series.

As a result of the value analysis article, we have been reviewing our system and are incorporating into it some of your ideas. It's too early to assess what we are doing, but there seems to be a good deal of enthusiasm generated as a result of this article.

R. G. Nau
Purchasing Dept.
Arvin Industries Inc.
Columbus, Ind.

'. . . Artwork Saves Me Time'



We take practically every business publication covering mechanical trades and/or new products. In 40 years, I can truthfully say that your articles and clever artwork save me the most time and have the best summation value.

Cory P. Geen
Vice President-General Manager
Industrial Devices Inc.
Philadelphia

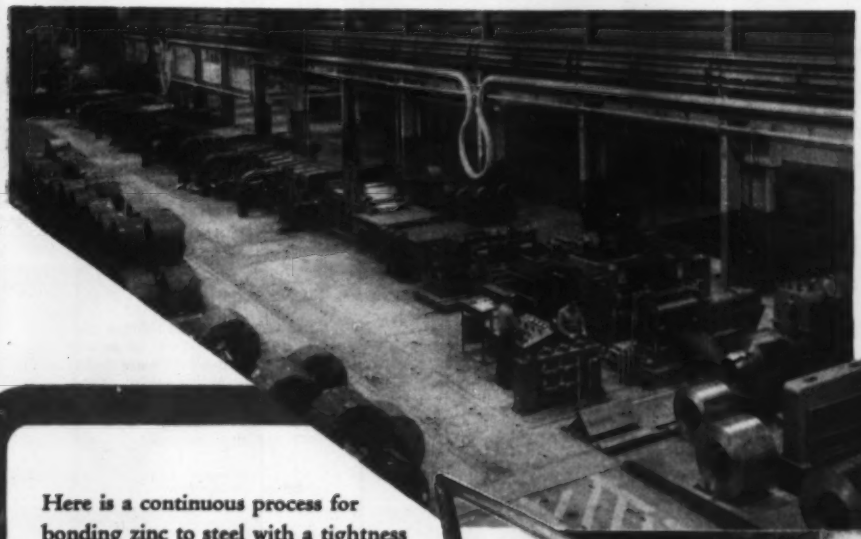
Comment from Secretary

It seems to me that engineering publications should devote space now and then to the engineering secretary and her problems. In some cases, it could be helpful to the better administration of the engineering department.

The engineering secretary not only has problems common to all secretaries but also problems unique to the engineering department. Business courses train the secretary, but the engineering secretary, as far as I know, must learn by trial and error. An exchange of ideas would be not only stimulating but helpful.

Because of new horizons and increased complexity of design and production throughout industry in all fields, the call is for engineers. Along with

(Please turn to page 12)

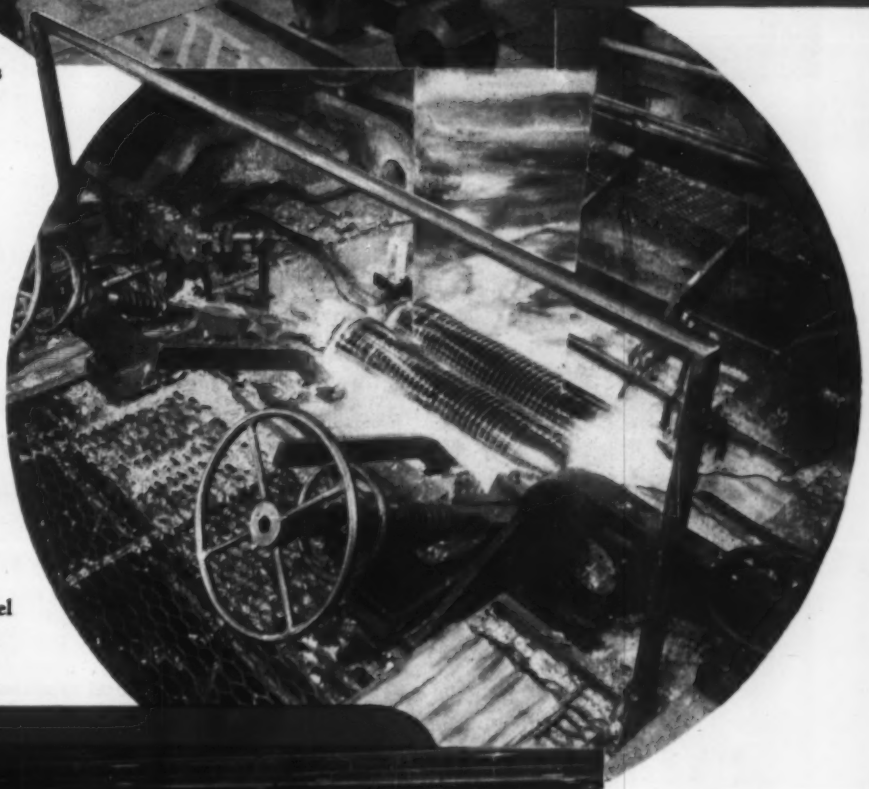


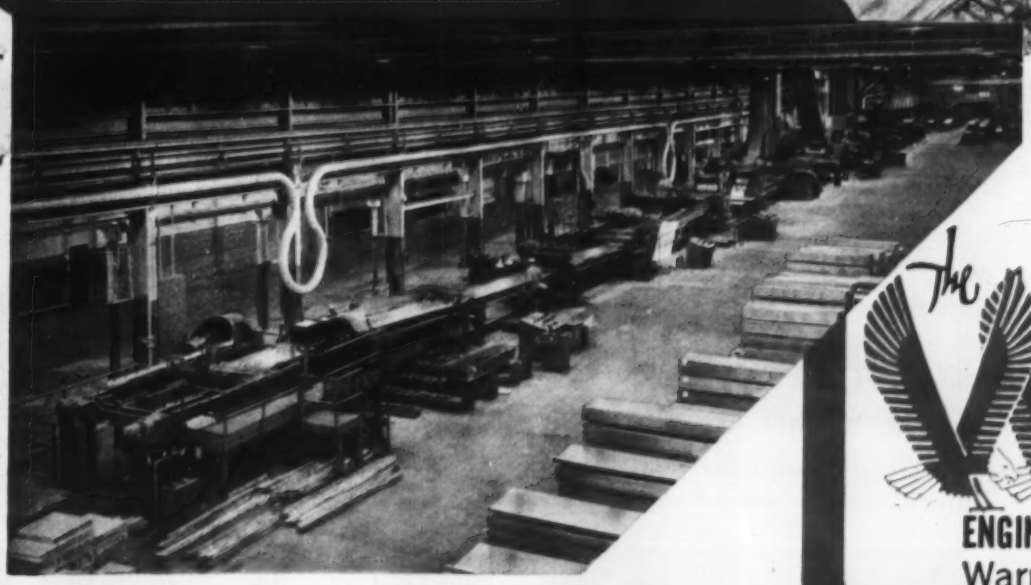
THE MOST modern design for continuous galvanizing

Here is a continuous process for bonding zinc to steel with a tightness that defies flaking and chipping regardless of use.

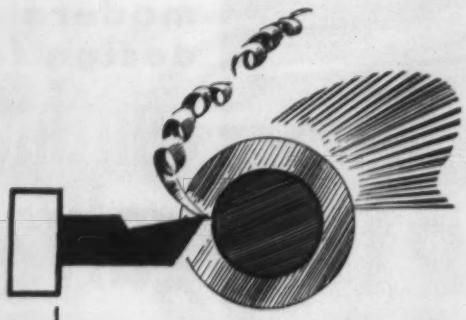
It, further, enables producers to achieve heretofore unobtainable flexibility and control of softness and coating weight. It is an important advancement in coated steels and is, as one steelmaker put it, "a miracle of modern engineering."

Equipment for the continuous coating of strip steels has long been a Wean Engineering specialty—and the equipment required for this continuous galvanizing line is no exception. At present, Wean facilities are heavily engaged in meeting the demands of the industry's leading steel producers for similar installations.





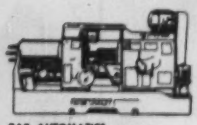
The WEAN ENGINEERING Co. Inc.
Warren, Ohio



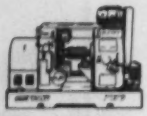
OUR JOB:

to provide the *Right Machine*

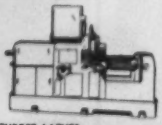
for YOUR JOB



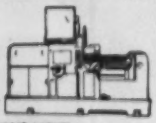
BAR AUTOMATICS
4 Spindle — 7 sizes, 1 to 7⅛"
6 Spindle — 9 sizes, ⅝ to 6"
8 Spindle — 6 sizes, ⅞ to 4"



CHUCKING AUTOMATICS
4 Spindle — 2 sizes, 10 and 12"
6 Spindle — 4 sizes, 8½ to 12"
8 Spindle — 2 sizes, 6 and 8"



TURRET LATHES
(Bar-Type — Fully Automatic)
Single Spindle — 3 sizes, 3½ to 8½



TURRET LATHES
(Chuck-Type — Fully Automatic)
Single Spindle — to 12" cap.

CHUCKING AUTOMATIC
Single Spindle ("Chuckmatic")
To 12" capacity

Management decisions regarding the purchase of new equipment are, and rightly so, reflecting an awareness of the fact that there are many areas of operation—other than actual machine design—which affect machining costs.

Machine performance, for instance, is being studied more closely in line with *the job to be done.* The buyer is becoming increasingly more conscious of the need for sales, service and engineering help—*when he needs it.* He is taking a closer look at the machine he is considering, in relation to the advantages of "operator familiarity"—will there be plenty of experienced help available.

Analyzing his problem and evaluating these important considerations, he usually finds *more* of the right answers at National Acme.

National Acme's experience in the design and manufacture of nearly 50,000 multiple-spindle bar and chucking automatics and fully automatic turret lathes provides a background of experience and versatility not to be found in less comprehensive lines of machines. This combination of *the RIGHT machine backed up by experienced and responsible engineering assistance* is hard to beat.

May we talk it over with you?

THE NATIONAL ACME COMPANY

189 East 131st Street, Cleveland 8, Ohio

LETTERS

(Concluded from page 10)

this increased demand for engineers is the need for competent engineering secretaries.

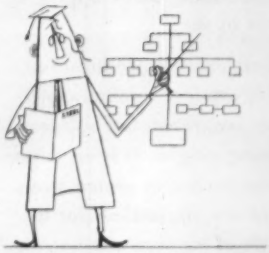
Eleanor Laird
Secretary to Chief Engineer
Industrial Division
Wayne Pump Co.
Ft. Wayne, Ind.

Seminar To Use Selector

We are impressed by your Metal Selector guide (insert in the Oct. 10 issue) and would like 150 copies. We are holding a value analysis seminar in Pittsfield and plan to distribute copies to our students (manufacturing and engineering supervisory personnel).

P. S. Demos
Purchasing Value Analyst
Power Transformer Department
General Electric Co.
Pittsfield, Mass.

Teacher Uses 1955 Series



I have found the 1955 Program for Management series interesting and helpful. I would appreciate a copy of the whole series for my file as I find the articles helpful instructional material.

Paul A. Bierwagen
Instructor in Management
Milwaukee Extension Division
University of Wisconsin
Milwaukee

Essence of Good Editing

Please send me copies of parts I and II of the article, "Atoms Mean Business" (Oct. 31, page 66 and Nov. 7, page 158).

I find your journal extremely useful, and articles of the type requested indicate that you accurately sense the reader interest well in advance—which is the essence of good editing.

Neville S. Spence
Metallurgical Engineer
24 Silvie St.
Deep River, Ont.

Please send two reprints of part I. We have found it informative and thought provoking.

M. H. Pryor Jr.
General Manager
Monroe Tool & Mfg. Co.
Monroe, Mich.

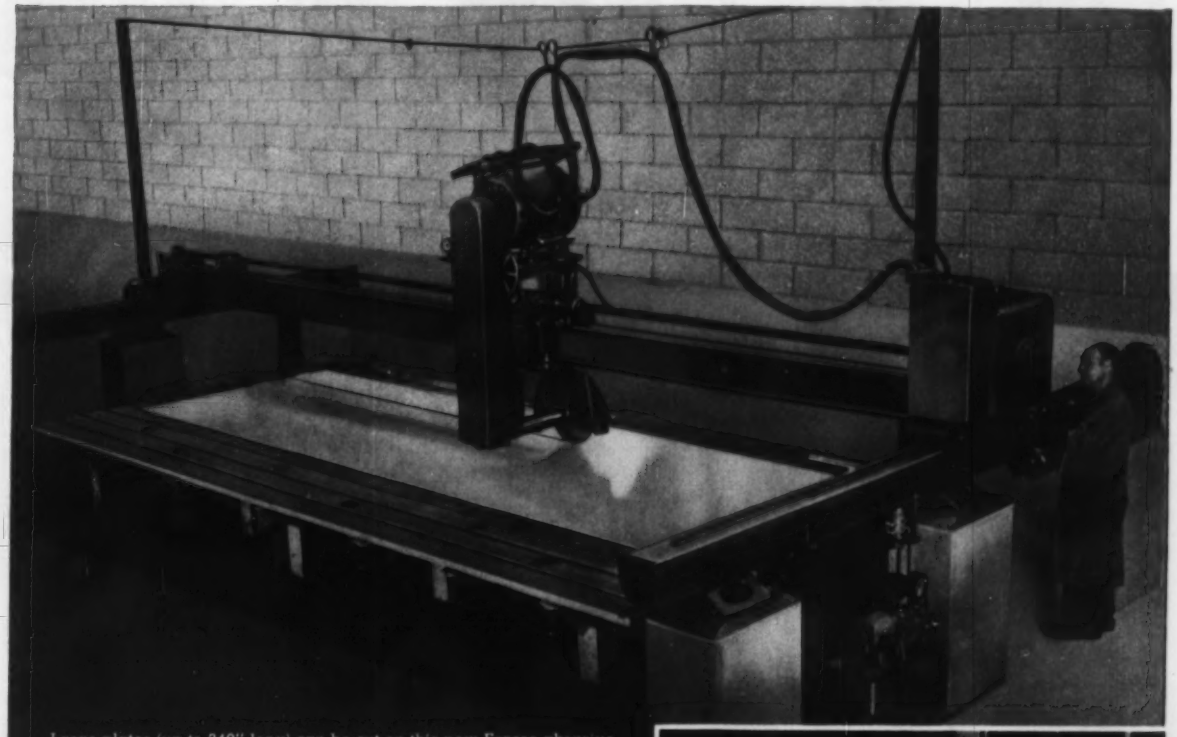
Apparatus Analyzes Metals

We would be interested in more information on the Spectromet mentioned in the Technical Outlook column of Oct. 31 (page 65) in the item, "Fast Analysis." Could you tell us to whom we can write for more details?

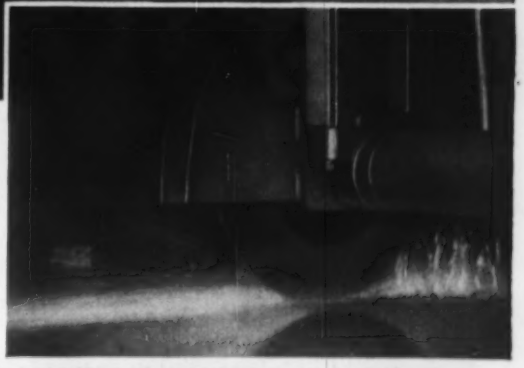
J. A. Cameron
Chief Metallurgist
Elliott Co., Inc.
Jeannette, Pa.

• *The Spectromet is manufactured by Baird Associates Inc., 33 University St., Cambridge 38, Mass. Winslow Davies is sales promotion manager.*

FRASSE INSTALLS HUGE ABRASIVE PLATE SAW...



Large plates (up to 240" long) can be cut on this new Frasse abrasive saw. This means fewer welds . . . lower labor costs . . . and a more saleable product.



This huge new abrasive saw . . . a giant in performance as well as size . . . enables Frasse to cut stainless steel and aluminum plates "to-order" from standard stock sizes. With it, plates up to 240" long can be cut—close tolerances can be kept — and square, smooth edges, suitable for most applications without further finishing, can be obtained.

To the fabricator, this means plate deliveries need no longer bottleneck production . . . inventories can be reduced . . . and edge finishing costs may be cut or wiped out completely, simply by phoning Frasse.

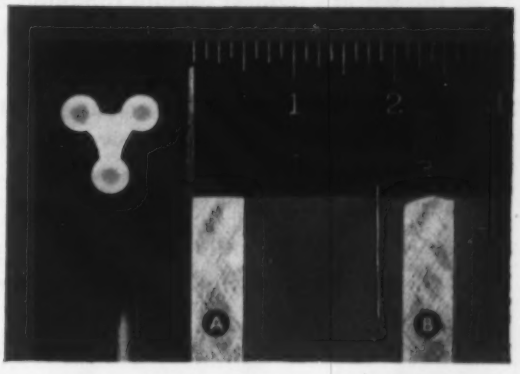
So, for dependable service, quick delivery . . . and a product that can contribute to your profit — depend on Frasse. A *choice* source for your stainless steel and aluminum requirements.

Call FRASSE 1st

For STAINLESS STEEL and ALUMINUM PLATES

Peter A. FRASSE and Co., Inc.

17 Grand Street • New York 13, New York • WAlker 5-2200
PHILADELPHIA • BUFFALO • SYRACUSE • HARTFORD
LYNDHURST • ROCHESTER • BALTIMORE



Abrasive cutting offers a superior edge that will in most cases reduce edge finishing costs. Note (a) cut on the new Frasse abrasive saw, (b) cut on a conventional shear.

WHY STEEL PRODUCTION COSTS GO DOWN WITH

1. **As the world's highest quality ramming mix for open hearth bottoms, Permanente 165 *lasts far longer* than other materials.**
2. **During this longer life, a Permanente 165 *Periclase* bottom requires *far fewer repairs*—thus drastically reduces down-time and repair material used!**
3. **As a result, you get more steel tonnage per month with Permanente 165—*and at lower bottom cost!***

Let your Kaiser refractory engineer provide *you* with research, design and installation service to help you obtain more tonnage, improved quality—and lower operating costs!

Call or write Kaiser Chemicals Division, *Kaiser Aluminum & Chemical Sales, Inc. Regional Sales Offices: 1924 Broadway,* OAKLAND *12, California . . . 3 Gateway Center,* PITTSBURGH, *Pennsylvania . . . 518 Calumet Building, 5231 Hohman Avenue, Hammond, Indiana* (CHICAGO).

Kaiser Chemicals

Pioneers in Modern Basic Refractories

Refractory Brick and Ramming Materials • Dolomite
Aluminas • Magnesia • Magnesite • Periclase

Carpenter ... pioneers in specially-engineered steels through continuing research

HOW FAR CAN YOU GO

in multiplying service life of critical parts?

Tips were breaking off these fuel injector nozzles for diesel engines within one to 30 days after installation. Result: costly damage to the engines. The nozzle manufacturer was on the spot. He needed a tougher steel . . . and one with greater hardening accuracy because the holes in the nozzle had to be held extremely small.

At this point the company called in Carpenter . . . and a Carpenter-engineered specialty steel was matched to the job. Service life of the nozzles promptly increased from 30 days to an average of two years. And shop fabricating problems literally disappeared.

Every week, more companies like yours are discovering just how far they can go in increasing service life of critical parts . . . reducing fabricating headaches . . . improving product salability. Here's one reason why: Carpenter quality and pioneering ability are backed by one of the largest staffs of skilled metallurgists, per pound of steel produced, in the industry.

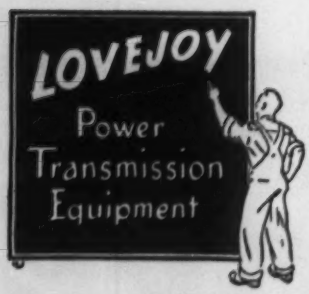
Can you honestly afford to remain "satisfied" when this road to improvement lies wide open? Start by sending for a copy of "A Guide to Specialty Steels as Made by Carpenter." *The Carpenter Steel Co., 139 W. Bern St., Reading, Pa.*

Are you taking advantage of these specially-engineered steels as made by Carpenter?

Matched Tool and Die Steels / Stainless Steels / Special Purpose Alloy Steels / Silicon and High Nickel Alloys / Valve, Heat-Resisting and Super Alloy Steels / Tubing and Pipe / Fine Wire Specialties

Carpenter STEEL

for product improvement



• Economical In Cost
• Maintenance-Free
• Easily Installed

Flexible Couplings:

No lubrication required. Quickly installed. Easily replaced. Cushions are reversible—can be changed or reversed without shutdown. Fractional to over 2400 hp. Light, medium or heavy duty.

Variable Speed Pulleys:

Quickly installed on new or old equipment. Change speed while machine is running. Ratios to 3 to 1. Fractional to 15 hp.

Select-O-Speed Transmissions:

Economical as compared to other variable speed transmissions. Instant adjustment over wide range of speeds. Hand wheel or lever control. Ratios to 10 to 1. Fractional to 5 hp.

Universal Joints:

Precision ground. Finest alloy steel. No binding, backlash or end play. 13 sizes, fractional to 207 hp. Bores ¼ to 2 in. Lengths 2 to 10⅝ in.

TYPES AND SIZES FOR ALL APPLICATIONS. Get full information today. Request catalogs.

LOVEJOY FLEXIBLE COUPLING CO.

4871 W. Lake St., Chicago 44, Illinois

STEEL
The Metalworking Weekly

Editor, IRWIN H. SUCH
Managing Editor, WALTER J. CAMPBELL
Assistant Managing Editors, VANCE BELL, JOHN S. MORGAN

WILLIAM M. ROONEY ..... *Market Editor*
J. D. KNOX ..... *Steel Plant Editor*
HARRY CHANDLER ... *Copy Editor*
FRANK R. BRIGGS ..... *Associate Editor*
ROBERT O. JAYNES ..... *Associate Editor*
AUSTIN E. BRANT ..... *Assistant Editor*
BYRON E. KENNEL ..... *Assistant Editor*
A. DONALD POSTMA ..... *Assistant Editor*
ROSS WHITEHEAD ..... *Assistant Editor*
MARY ANN STUVE ..... *Editorial Assistant*
ALLEN G. GRAY ..... *Technical Editor*
ROBERT F. HUBER ..... *Machine Tool Editor*
VAN CALDWELL ..... *Associate Editor*
MICHAEL A. L. WEBSTER .. *Associate Editor*
H.-H. VON KOSCHEMBAHR .. *Assistant Editor*
MARY T. BORGERHOFF ..... *Assistant Editor*
MARY ALICE LYMAN ..... *Assistant Editor*
EILEEN CORTES ..... *Assistant Editor*
JUNE TUTTLE ..... *Editorial Assistant*
BEVERLY CLINE .. *Editorial Service*

Resident Editors

New York 17 ..... 60 E. 42nd St.
B. K. PRICE, L. E. BROWNE
STANLEY B. STEWART
Murray Hill 2-2581

Chicago 11 ..... 520 N. Michigan Ave.
EARLE F. ROSS, WILLIAM E. DEAN
Whitehall 4-1234

Pittsburgh 19 ..... 2837 Koppers Bldg.
ROBERT M. LOVE
Atlantic 1-3211

Detroit 26 ..... 1249 Washington Blvd.
FLOYD G. LAWRENCE
Woodward 3-3488

Washington 4 .... 1123 National Press Bldg.
JAMES P. MORRISSEY
Executive 3-6849

London, 2 Caxton St., Westminster S. W. 1
VINCENT DELPORT
European Editor

Editorial Correspondents

Birmingham ..... R. W. KINCEY
Birmingham 3-1121

Buffalo ..... L. G. FELDMANN
Cleveland 5353

St. Louis ..... MAC L. HUTCHENS
Republic 7752

Youngstown ..... GEORGE R. REISS
Riverside 7-1471

Los Angeles ..... NORMAN LYNN
Webster 5-3040

San Francisco ..... EDWIN HAVERTY
Yukon 6-5151

Seattle ..... R. C. HILL
Melrose 1895

Cincinnati ..... JACK DUDLEY
Beechmont 7598

Toronto, Canada ..... F. S. TOBIN
Empire 4-9655

Birmingham, England ..... J. A. HORTON

Paris, France ..... LEON JAUDOIN-PROM

Liege, Belgium ..... JACQUES FOULON

Dusseldorf, Germany ... DR. HERBERT GROSS

BUSINESS STAFF

Advertising Director ..... H. G. ROWLAND
Advertising Service Mgr. .... DORIS MITCHELL
Production Manager ..... A. V. ANDERSON
Circulation & Promotion Dir. .. S. F. MARINO
Circulation Manager ..... G. R. EBERSOLE
Marketing Director ..... D. C. KIEFER
Market Research Dir. .... N. R. LADABOUCHE
Direct Mail Service ..... AMY LOMBARDO
Reprints ..... JUNE SCHILENS
Classified Advertising ... BETTY MARKWORTH

Advertising Representatives

New York 17 ..... 60 E. 42nd St.
K. A. ZOLLNER, GUY LABAW
Murray Hill 2-2581

Philadelphia ..... 200 Wynnewood Ave.
Wynnewood, Pa.
WM. J. VERSCHOOR—Midway 2-6512

Farmington, Conn. .... 12 Farmstead Lane
CALVIN FISHER JR.—Orchard 7-1756

Rochester, N. Y. ..... 217 Ridgeview Dr.
East Rochester, N.Y.
HAROLD A. DENNIS—Browning 2105

Pittsburgh 19 ..... 2837 Koppers Bldg.
J. C. SULLIVAN—Atlantic 1-3211

Cleveland 13 ..... Penton Bldg.
J. K. GILLAM, WM. J. D'ALEXANDER
Main 1-8260

Cincinnati 6 ..... 2215 Victory Pky.
E. L. FRANKE—Parkway 1-3640

Detroit 26 ..... 1249 Washington Blvd.
C. A. TALLINGER JR.—Woodward 3-3488

Chicago 11 ..... 520 N. Michigan Ave.
L. C. PELOTT, W. L. POLAND
JOHN W. VAUGHAN
Whitehall 4-1234

Los Angeles 48 .. 6262 Commodore Sloat Dr.
F. J. FULLER—Webster 1-6865

San Francisco 4 ..... 57 Post St.
F. J. FULLER, Robert W. Walker Co.
Sutter 1-5568

Griffin, Georgia ..... 331 S. 12th St.
FRED J. ALLEN—Griffin 7854

BPA

NBP

Published Every Monday by
THE PENTON PUBLISHING CO., Penton Bldg., Cleveland 13, O.
MAin 1-8260

G. O. HAYS ..... *President and Treasurer*
R. C. JAENKE ..... *Executive Vice President*
F. G. STEINEBACH .... *Vice President and Secretary*
F. O. RICE ..... *Vice President*
J. P. LIPKA ..... *Asst. Secy. and Asst. Treas.*

Also Publisher of
FOUNDRY, MACHINE DESIGN, NEW EQUIPMENT DIGEST, AUTOMATION

Member of Business Publications Audit of Circulation Inc., Society of Business Magazine Editors and National Business Publications Inc.

THE NINTH STREET BRIDGE at Wheeling, W. Va., fabricated and erected by U.S. Steel's American Bridge Division, crosses the Ohio River. Its main span is 580 feet long and weighs 2,692 tons.

2,692-ton bridge "see-saws" on four edges of USS "T-1" steel!

The main arch of the Ninth Street Bridge at Wheeling, W. Va., stretches 580 feet over the Ohio River. The entire weight of this 2,692-ton span rests on 4 thin edges of USS "T-1" steel.

This main span has four arch shoes, each supporting 673 tons. At the greatest point of stress in each shoe is a thin plate of "T-1" steel, machined to a shallow edge. "T-1" steel was chosen because it has a minimum yield strength of 90,000 psi, and long life under extreme atmospheric conditions.

On bridge jobs of all types, use "T-1" steel where very *high stresses* are involved and where you need weldability without pre- or post-heating. "T-1" has excellent *impact resistance* at low temperatures. Its very high strength (105,000 psi minimum) makes it ideal for gusset plates, structural members and other component bridge parts.

THE ENTIRE MAIN SPAN rests on four cast iron arch shoes like this. Two plates of "T-1" steel are pressed into the heart of each shoe at the contact point. "T-1" steel's 90,000 psi yield strength enables it to withstand the high stress.

LIKE A "SEE-SAW." As the bridge expands laterally, the upper shoe rocks over slightly to relieve expansion stress. The plate in the lower expansion shoe has been machined to an edge and acts as a fulcrum for the rocker movement of the upper shoe. At this point the "T-1" steel supports a load of 673 tons.

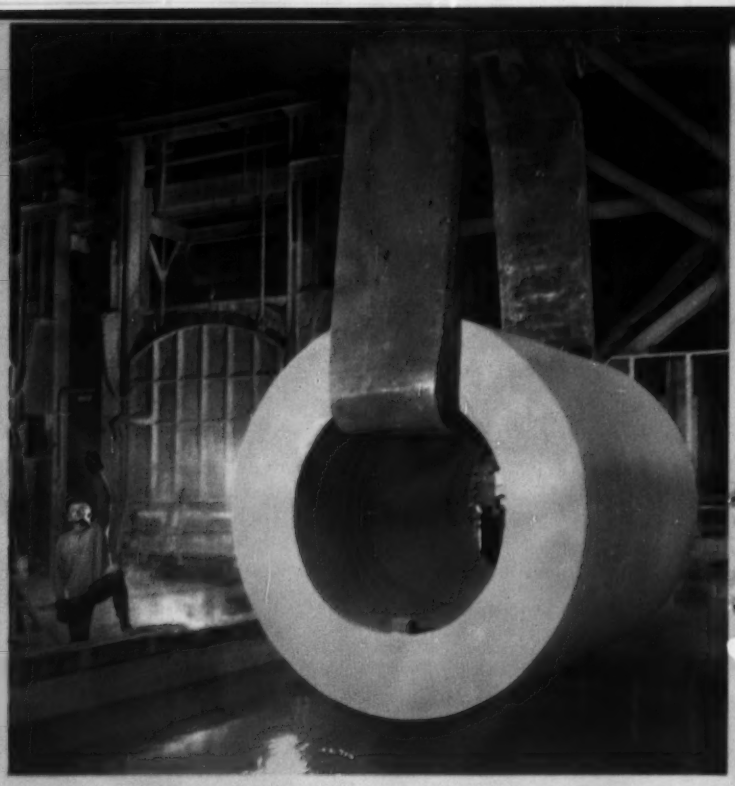
UNITED STATES STEEL CORPORATION, PITTSBURGH · COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. · UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS "T-1" CONSTRUCTIONAL ALLOY STEEL

USS

UNITED STATES STEEL

Here, one of the cylinders is being forged on the 7,000-ton press. Masterful work on the mandrel and precision manipulation of the press provide proper thickness/diameter ratio.



The cylinder (largest of its kind ever forged) is about to be lowered into the water quench tank after heat treating.

GE gets ready to make some big crashes

General Electric's Large Steam Turbine-Generator Department recently installed a high-speed burst pit to investigate the bursting characteristics of wheels and rotors. Model forged turbine and generator shafts and other partial and full scale parts will be spun at speeds up to 25,000 rpm or until they burst.

The big burst pit includes two concentric forged steel cylinders, made by the Homestead Forgings Division of U. S. Steel. These 60-ton cylinders must possess a strength that almost defies description because tremendous forces are at work here.

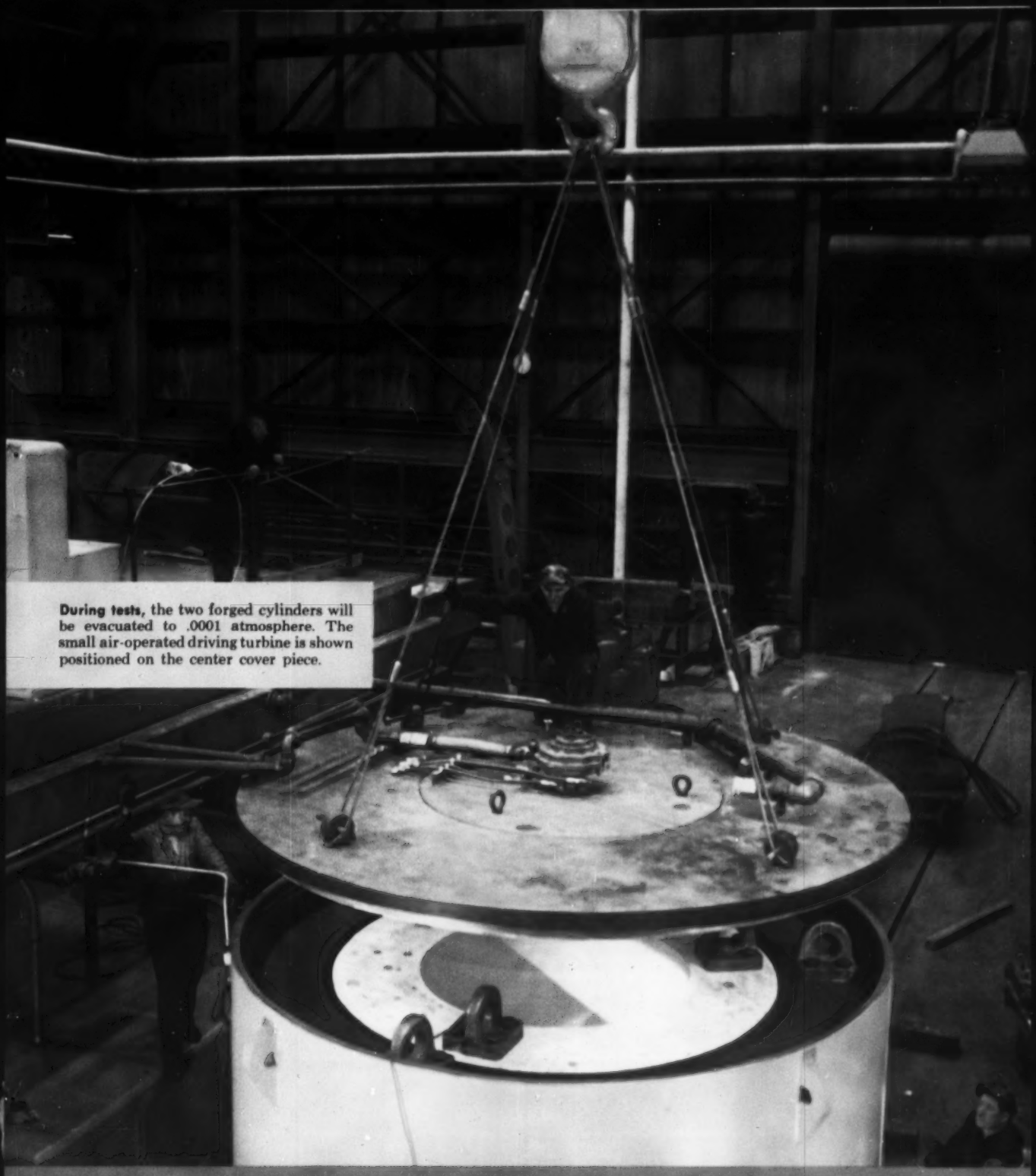
Imagine 200 automobiles traveling 100 mph crashing simultaneously. These U. S. Steel Quality Forgings have been designed to absorb that same amount of energy (200 *million* foot pounds).

With this testing facility, General Electric engineers expect to learn new things about material strength and rotor design which will permit building ever-better turbine-generator units to keep up with the demand for low-cost electric power.

U. S. Steel's Homestead Forgings Division produces a complete range of high-quality forgings, including turbine-generator shafts, heavy machinery parts, and giant sleeves like GE is using in this burst pit. We solicit your inquiries or requests for our free booklet on USS Quality Forgings. Just write to United States Steel, 525 William Penn Place, Room 4799, Pittsburgh 30, Pa.

SEE The United States Steel Hour. It's a full-hour TV program presented every other week by United States Steel. Consult your local newspaper for time and station.

UNITED STATES STEEL



During tests, the two forged cylinders will be evacuated to .0001 atmosphere. The small air-operated driving turbine is shown positioned on the center cover piece.

USS

Quality FORGINGS

- heavy machinery parts—carbon, alloy, stainless
- forged steel rolls and back-up roll sleeves
- electrical and water wheel shafts
- hammer bases and columns

Case tractor platforms "safe-treaded" with Multigrip

Tractor drivers often find it necessary to stand while they maneuver. Loss of footing in such cases can result in serious injury to drivers or damage to equipment. To avoid accidents of this sort, J. I. Case Co., Racine, Wisc., uses USS Multigrip Floor Plate for foot platforms on *all* Case '400' Tractors. They know Multigrip's clean-edged, flat-topped risers give sure footing from all angles.

USS Multigrip Floor Plate is your safest bet *wherever* traction and sure footing are important. Its evenly spaced, "safe-tread" risers are real accident stoppers on steps, ramps, platforms and entire floor areas. Because Multigrip is made from tough steel, it won't chip, splinter or crack and can be formed for structural use. It is easy to clean, and it drains in *all* directions. Multigrip is available in large plates, reducing cost of installation. For safety's sake—always specify USS Multigrip Floor Plate.

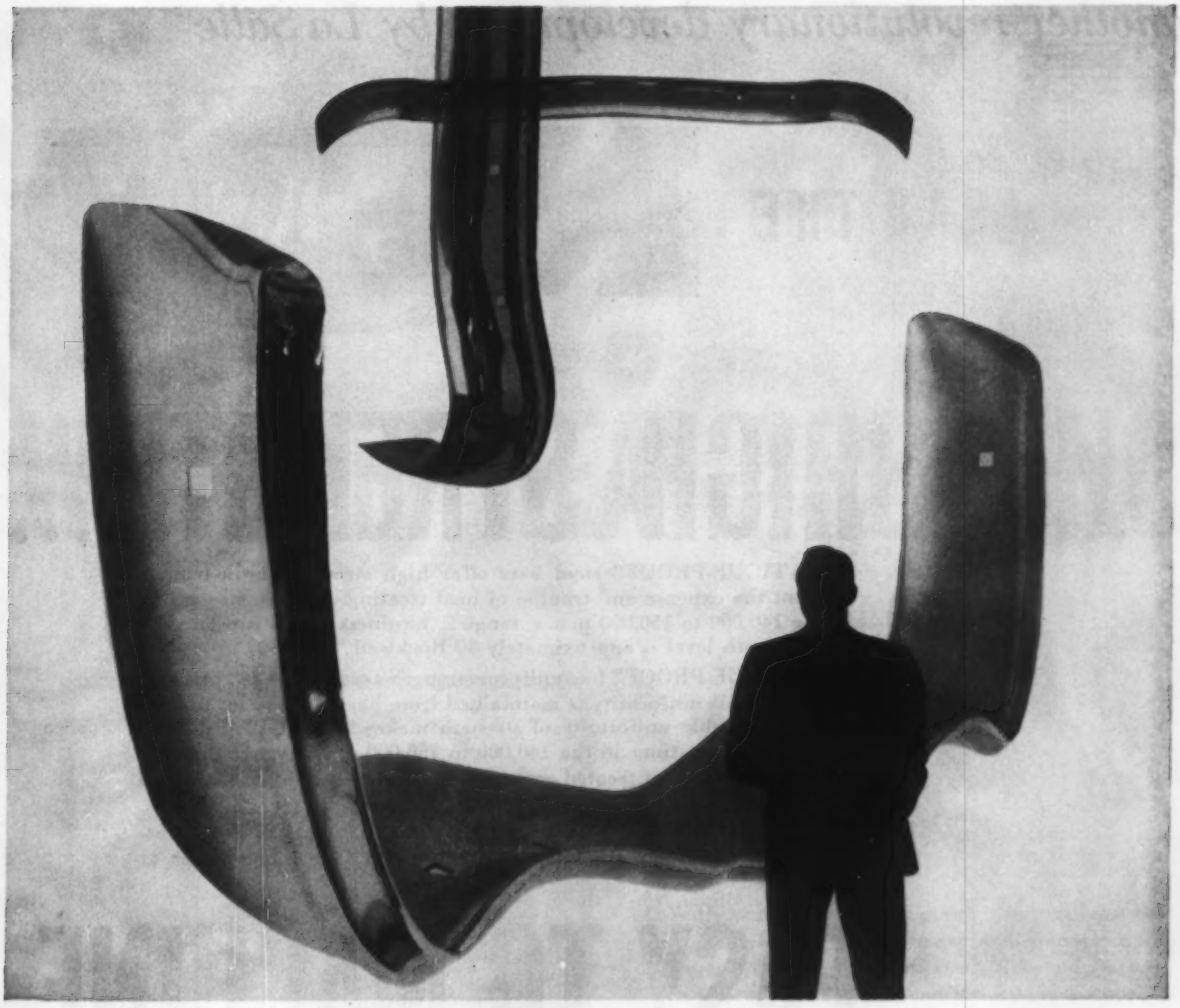
Multigrip foot platforms make it safe for the driver to stand while driving any Case '400' tractor. Multigrip's evenly spaced, "safe-tread" risers assure safe footing even when wet or oily. Notice how the Multigrip plates have been bent to form a lip along the side of the foot platform.

UNITED STATES STEEL CORPORATION, PITTSBURGH · COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. · UNITED STATES STEEL SUPPLY DIVISION, CHICAGO
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS multigrip FLOOR PLATE

Sold by leading distributors from coast to coast

UNITED STATES STEEL



Deep-draw costs come down—fast . . .

. . . thanks to the Pennsalt FOS Process. Any way you look at it, severe deep-drawing of automobile parts, such as these bumpers, is being made easier, cleaner, and more economical by modern Pennsalt drawing lubricants. Steel strip comes to the dies pre-coated with Foscoat 40 and Drawcote.

Foscoat is a phosphatizing compound that prepares the work for the appropriate dry FOS lubricant; Drawcote forms a dry, homogeneous protective and lubricating film to speed the most severe drawing operation.

With these two Pennsalt chemicals, the auto industry is deep-drawing, stamping, and extruding steel parts at much lower cost than was previously possible. Die life is greatly increased. Plating is smoother with less finish buffing, because drawn parts are freed from die seizures, scratching, and irregularities. And these modern *dry* lubricants make the press shop a cleaner, safer place to work in.

For the severest deep draws in ferrous metals, the combination of Foscoat and Drawcote is literally working wonders. For lighter draws, and for certain special applications, Drawcote *alone* is recommended. With the full FOS line (Fosclean, Fosrinse,® Fospray, Foscoat,® Drawcote,® Foslube®), Pennsalt offers a process to meet every ferrous metal drawing requirement. And what is more, metal pre-coated with the FOS Process seldom needs re-coating for the next press stages.

For information on the Pennsalt FOS Process to fit *your* drawing or stamping needs, send blueprints of parts you're cold-forming, and give us details on type of steel, length of run. No obligation, of course. Customer Service Department, Pennsylvania Salt Manufacturing Company, Three Penn Center Plaza, Philadelphia 2, Pa.

FOSCLEAN AND FOSPRAY ARE TRADEMARKS OF PENNSYLVANIA SALT MFG. CO.

Pennsalt Chemicals

another revolutionary development by La Salle

THE NEW

. . . gives HIGH STRENGTH . . .

"FATIGUE-PROOF" steel bars offer high strength in-the-bar . . without the expense and trouble of heat treating. Tensile strength is in the 140,000 to 150,000 p. s. i. range . . hardness which is related to this strength level is approximately 30 Rockwell "C."

"FATIGUE-PROOF" has uniform strength across the bar . . no soft centers. (This uniformity is maintained from bar to bar . . lot to lot.) This remarkable uniformity of strength makes "FATIGUE-PROOF" ideal for applications in the 140,000 to 150,000 p. s. i. range that formerly required heat treated carbon and alloy steels, either hot rolled or cold drawn.

With "FATIGUE-PROOF" you'll get the advantages of heat treating . . none of the disadvantages. In short, you'll get a better part at lower cost.

. . . yet it's EASY TO MACHINE

"FATIGUE-PROOF" *is* a free-machining steel bar . . without question. It machines at least 25% faster than annealed alloys . . 50% to 100% faster than heat treated alloys.

"FATIGUE-PROOF's" excellent machinability permits faster speeds, heavier feeds, better tool life . . your production rates will increase . . you'll get more parts per hour.

Distortion from machining is held to a minimum . . there is no reduction of tool life due to the higher speeds and heavier feeds . . and surface finish is greatly improved.

La Salle STEEL CO.

1414 150th Street, Hammond, Indiana

Manufacturers of America's Most Complete Line of Quality Cold-Finished Steel Bars

fatigue-proof STEEL BAR

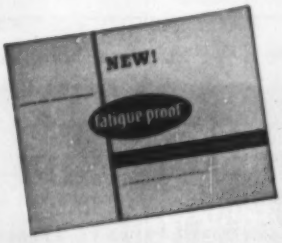
WITHOUT HEAT TREATING

- *no quench cracks*
- *no distortion from heat treating*

With heat treating eliminated, the problems that accompany heat treating are avoided. Quench cracks become a thing of the past. Distortion and warpage from heat treating don't occur . . consequently time consuming and costly straightening and cleaning operations are not necessary.

You eliminate not only the cost of heat treating but also its disadvantages.

If you have parts where strength is a requirement . . you can save money and get away from problems by using "FATIGUE-PROOF." Our Sales Engineers will be happy to show you how this can be accomplished and provide samples for test purposes.

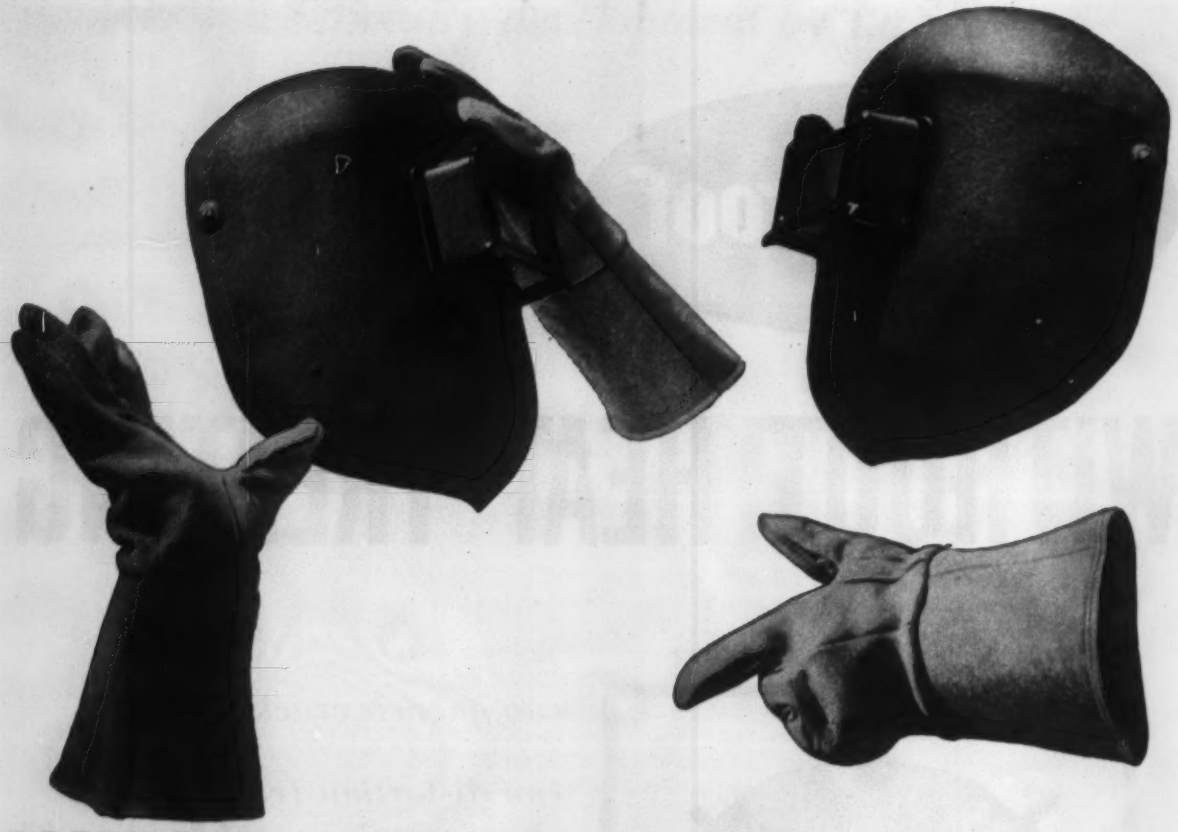


JUST PUBLISHED! Ask for your copy of the new 20-page booklet which gives additional information on the remarkable new "FATIGUE-PROOF."

LA SALLE STEEL CO.
1414 150th Street
Hammond, Indiana

Please send me your "FATIGUE-PROOF" Bulletin.

Name_____
Title _____
Company_____
Address_____
City_____ Zone____ State_____



WHAT—*HANDLES LIKE CARBON STEEL?*

That's right. 3 times stronger than carbon steel, Lukens "T-1" steel can be welded without preheating or special joint design.

Although Lukens "T-1" steel is a tough, high strength, heat treated steel, equipment builders will find that the techniques of working with this new steel are no different than with carbon steel. Recognizing that higher strength steels require higher pressures to form, proper design procedures will permit this low carbon, quenched and tempered alloy plate steel to be fabricated not only in the shop but also in the field. Those items of equipment which may not have to be stress relieved for dimensional stability or other special reasons can be fabricated of Lukens "T-1" steel to take advantage of its tough "as-welded" characteristics.

In addition to easy fabrication, Lukens "T-1" steel has other benefits of equal value to equipment builders. Three times stronger than carbon steel, this new steel has lighter weight and reduced thickness in comparison to heavier, thicker plates of carbon steel, thereby reducing material, fabrication and shipping costs. Lukens "T-1" steel's excellent resistance to the combination of wear and impact abuse lowers maintenance and replacement costs, lengthens equipment life. Lukens' range of steel plate sizes—including the widest and heaviest plates available anywhere—makes possible additional savings for builders through the use of wider plates that require fewer welded seams.

A new addition to Lukens' complete line of carbon, alloy and clad steels, this new steel's unusual combination of properties suit it especially to applications in pressure vessels, bridges, shipbuilding, construction machinery and general industrial equipment. On problems of design, material selection, application and fabrication techniques, Lukens offers full technical assistance. If you would like further information on Lukens "T-1" steel, write to Manager, Marketing Service, 773 Lukens Building, Lukens Steel Company, Coatesville, Pennsylvania.

LUKENS

"T-1" STEEL

To get the new, 28-page book on Lukens "T-1" steel, ask for Bulletin 781.

THE NEWEST IN A COMPLETE LINE OF ALLOY STEELS

LUKENS STEEL COMPANY, COATESVILLE, PENNSYLVANIA

"CINCINNATI"

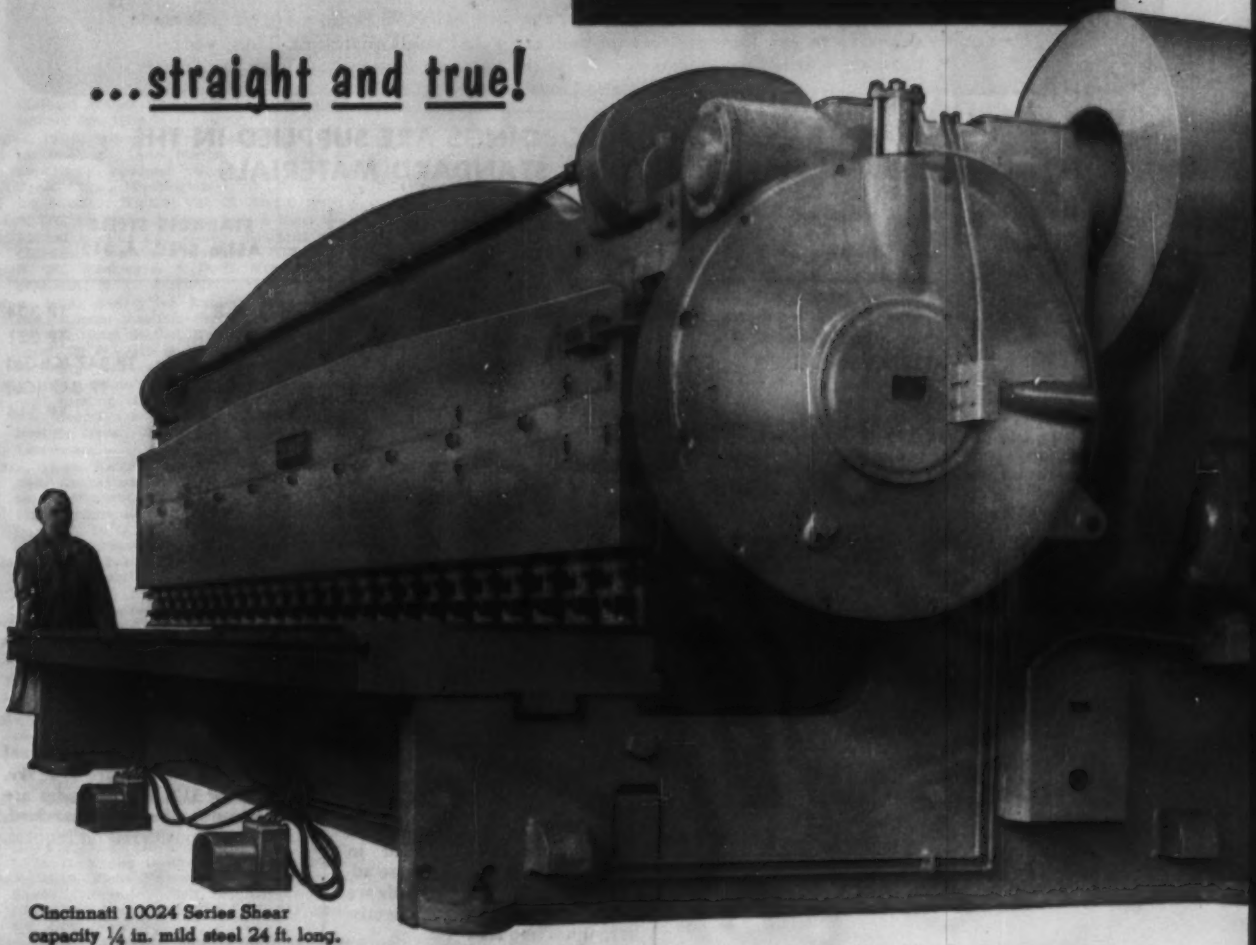
...shears 24 feet of ¼ inch plate

...straight and true!

Cincinnati Shears, built with machine tool accuracy and exceptional rigidity, cut to close tolerances even on the longest cuts.

Built in lengths from 4 ft. to 24 ft., they shear .005" thick sheets to 1¼ in. plate with micrometer accuracy. They handle a wide variety of materials ranging from soft aluminum to armor plate.

Write for complete shear catalog S-7.

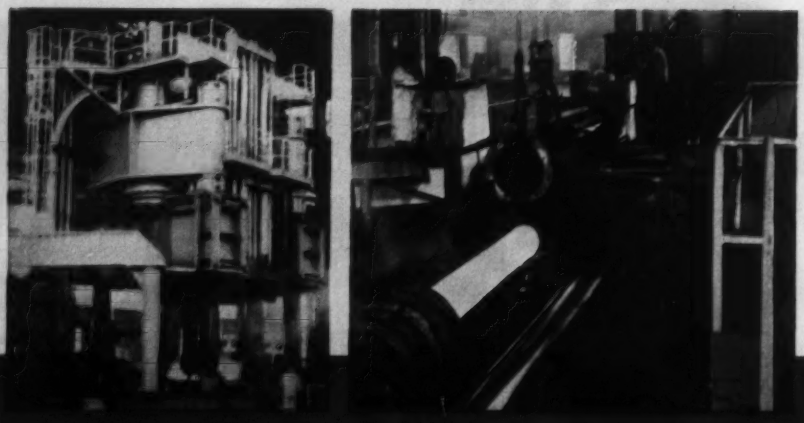


Cincinnati 10024 Series Shear capacity ¼ in. mild steel 24 ft. long.

CINCINNATI

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES



B&W HOLLOW FORGINGS

— to 35⅝ inches O. D. in a Wide Range of Analyses

The broad choice in B&W sizes and analyses of B&W Hollow Forgings is made doubly desirable by excellent delivery on both large and small quantities. Thus, your production schedules can be met—with the size, quantity and analyses you specify.

B&W HOLLOW FORGINGS ARE SUPPLIED IN THE FOLLOWING STANDARD MATERIALS

CARBON STEELS

ASTM A 106 Grade A
ASTM A 106 Grade B
ASTM A 106 Grade C

Analyses such as SAE or AISI carbon steel will be considered if quantities are sufficient.

INTERMEDIATE CROLOYS ASTM SPEC. A 335

Carbon Moly	P 1
Carbon Moly High Silicon	P 15
Croloy ½	P 2
Croloy 1	P 12
Croloy 1¼	P 11
Croloy 1¾	P 3
Croloy 2	P 3b
Croloy 2¼	P 22
Croloy 3M	P 21
Croloy 5	P 5
Croloy 5 Si	P 5b
Croloy 7	P 7
Croloy 9-M	P 9

ASTM Spec. A 335 has superseded and replaced ASTM Specs. A 158, A 206, A 280 and A 315.

This list includes all grades of A 335 except grade P 5c, which we do not make.

B&W Croloys, 2½, 3, 5M, 7M, and 9, are not included in A 335. We will supply these additional alloys in accordance with A 335, except for chemistry, upon request.

STAINLESS STEELS ASTM SPEC. A 312

Croloy 18-8	TP 304
Croloy 18-8 Ti	TP 321
Croloy 18-8 Cb-Ta	TP 347 (Cb-Ta)
Croloy 18-8 Cb	TP 347 (Cb)
Croloy 16-13-3	TP 316

These grades will also be made to ASTM specification A 376 excluding "special inspection" requirements.

Other grades of Stainless Steel listed under A 312 are TP 309, TP 310, TP 317. These grades are presently not offered as standard, but will be considered on request.

For the complete B&W Hollow Forgings story, send for new Bulletin S-16B. The Babcock & Wilcox Company, Process Equipment Department, Barberton, Ohio.

BABCOCK & WILCOX

BOILER DIVISION

S-441

CALENDAR
OF MEETINGS

Nov. 28-Dec. 1, Air Conditioning & Refrigeration Exposition: Atlantic City Auditorium, Atlantic City, N. J. Information: Clapp & Poliak Inc., 341 Madison Ave., New York 17, N. Y.

Dec. 5-9, National Exposition of Chemical Industries: Commercial Museum and Convention Hall, Philadelphia. Information: International Exposition Co., 480 Lexington Ave., New York 17, N. Y. Manager: E. K. Stevens.

Dec. 7-9, American Institute of Mining & Metallurgical Engineers: Electric furnace steel conference, William Penn hotel, Pittsburgh. Institute's address: 29 W. 39th St., New York, N. Y. Secretary: E. H. Roble.

Dec. 7-9, National Association of Manufacturers: Annual meeting and exhibit, Waldorf Astoria, New York. Association's address: 2 E. 48th St., New York, N. Y. Secretary: Noel Sargent.

Dec. 12-13, Material Handling Institute Inc.: Annual meeting, Hotel Statler, New York. Institute's address: One Gateway Center, Pittsburgh 22, Pa. Managing director: R. Kennedy Hanson.

Dec. 12-16, Atomic Exposition and Nuclear Engineering & Science Congress: Public Auditorium, Cleveland. Information: International Atomic Exposition, 931 Book Bldg., Detroit 26, Mich.

Dec. 13-15, Industrial Truck Association: Winter meeting. Hotel Statler, New York. Association's address: Washington Loan & Trust Bldg., Washington 4, D. C. Managing director: William Van C. Brandt.

Jan. 3-6, Institute of Scrap Iron & Steel Inc.: Annual meeting and exhibit, Sherman hotel, Chicago. Institute's address: 1729 H St. N. W., Washington 6, D. C. Executive vice president: E. C. Barringer.

Jan. 9-13, Society of Automotive Engineers Inc.: Annual meeting, Sheraton-Cadillac hotel and Hotel Statler, Detroit. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: John A. C. Warner.

Jan. 11-13, Aluminum Extruders Council: Annual meeting, Saxony hotel, Miami Beach, Fla. Council's address: 209 Washington St., Boston, Mass. Executive secretary: Phillip Lemelman.

Jan. 11-14, American Road Builders' Association: Annual convention and exhibit, Municipal Auditorium, Miami Beach, Fla. Association's address: World Center Bldg., Washington 6, D. C. Executive vice president and secretary: Eugene Reybold.

Jan. 18-19, Caster & Floor Truck Manufacturers Association: Annual meeting, New Weston hotel, New York. Association's address: 27 E. Monroe St., Chicago 3, Ill. Secretary: Harry P. Dolan.

Jan. 30, Malleable Founders' Society: Semi-annual meeting, Hotel Cleveland, Cleveland. Society's address: 1800 Union Commerce Bldg., Cleveland 15, O. Secretary: Lowell D. Ryan.

Jan. 23-24, Industrial Heating Equipment Association: Annual meeting, LaSalle hotel, Chicago. Association's address: Associations Bldg., Washington 6, D. C. Executive vice president: Carl L. Ipsen.

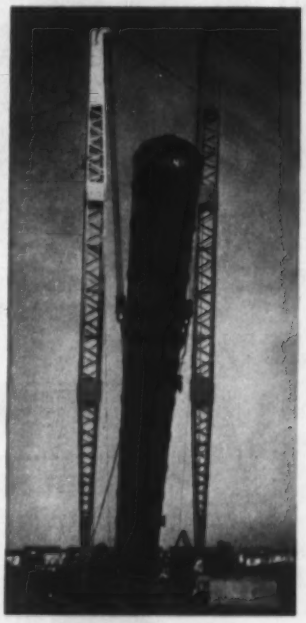
Jan. 23-25, Truck-Trailer Manufacturers Association Inc.: Annual meeting, Edgewater Gulf hotel, Edgewater Park, Miss. Association's address: 710 Albee Bldg., Washington 5, D. C. Managing director: John B. Hulse.

Jan. 23-26, Plant Maintenance & Engineering Show: Convention Hall, Philadelphia. Information: Clapp & Poliak Inc., 341 Madison Ave., New York 17, N. Y.

Jan. 24-27, American Management Association: General management conference, Fairmont hotel, San Francisco. Association's address: 330 W. 42nd St., New York 36, N. Y. Vice president-secretary: James O. Rice.

Jan. 26-27, Blast Furnace & Coke Association of the Chicago District: Winter meeting, Del Prado hotel, Chicago. Information: C. W. Bruce, chief engineer, Republic Steel Corp., 11600 S. Burley Ave., Chicago 17, Ill.

Multiple-part Red-Strand Slings handle heaviest loads, and are easy to apply to both the load and the crane hook. User tests in Detroit proved Red-Strand slings withstood unusual abuse, yet maintained higher-than-rated strength. A Gary plant uses Red-Strand single-part slings for many lifting jobs like this. These slings are available with various combinations of end fittings for attaching the sling to rings or lugs.



A heavy cylindrical load usually calls for multiple-part Red-Strand Flat-Laced slings. They are strong, flexible and do not slip or abrade.

How to Select the Correct Sling for Your Job

Start your sling selection by analyzing five factors:

1. The load—its size, weight, shape, finish.
2. Working area, amount of head room.
3. Size and type of crane hook.
4. Angle of sling legs.
5. Location and type of lugs or rings, if any.

From this information your supplier can recommend the sling by type, size and length that is safest, longest lasting and most economical for your job.

Types of Slings

Multiple-part slings are always recommended for heavy duty service, because for equal strength they are far more flexible than single-part slings. They hug the shape of the load easily, present a greater bearing surface to the load, and reduce the possibility of marring surfaces.

Where these factors are not so important, either Red-Strand *single-part slings* or *grommet slings* may be used for economy. Single-part Red-Strand slings are often recommended for lifting lighter weight objects, or those that have fixed attaching rings or lugs. Grommet, or continuous strand Red-Strand slings are ideal for forming hitches of various types without fittings.

When you re-use Pin-Lock thimbles you reduce sling costs by 21%

Extra Savings

Two suggestions will help you save money on slings.

The first is to re-use Pin-Lock thimbles on multiple part slings. These exclusive Leschen Pin-Lock thimbles cut sling costs on an average of 21% because they may be used again and again. They lock into sling loops with pins instead of permanent clamps, permitting re-use, and eliminating constant expense of thimble replacements.

The second suggestion is to use Red-Strand slings because they are made of *higher-than-rated* quality Leschen wire rope that delivers *longer-than-expected* service.

Get a copy of Leschen's *Sling Handbook* for complete information. Ask your Leschen man for one, or write.

Depend on Leschen's higher-than-rated quality for longer-than-expected service.

LESCHEN
HERCULES Red-Strand® WIRE ROPE

LESCHEN WIRE ROPE DIVISION
H. K. PORTER COMPANY, INC.
St. Louis 12, Missouri

HKP

Here's where you get the answers to steel problems

●Look under "The Youngstown Sheet and Tube Company" in one of these alphabetical or classified phone books.

They represent the 28 conveniently located district sales offices Youngstown maintains across the country. Offices staffed by men who know the steel business. Men who know and understand your steel problems. Men who are qualified to help you get the specific steel you need.

When you want answers to steel problems in a hurry, just call the Youngstown office nearest to you.

QUALITY YOUNGSTOWN SERVICE

THE YOUNGSTOWN SHEET AND TUBE COMPANY *Manufacturers of Carbon, Alloy and Yoloy Steel*

General Offices Youngstown, Ohio District Sales Offices in Principal Cities.

SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT AND EMT - MECHANICAL TUBING - COLD FINISHED BARS - HOT ROLLED BARS - WIRE - HOT ROLLED RODS - COKE TIN PLATE - ELECTROLYTIC TIN PLATE - BLACK PLATE - RAILROAD TRACK SPIKES - MINE ROOF BOLTS

Right off your Square D Distributor's shelf!

New QMB Saflex Distribution Panelboard

Exactly the Power Panelboard you want—when you want it. Your Square D Distributor stocks boxes, interiors and plug-in units which can be quickly assembled to meet virtually any specifications. Above, interior ready for easy mounting in box.

Plug-in Units are installed easily on tubular bus bars. The solid neutral can be changed in minutes. Here is flexibility that reduces "down time" and saves money.

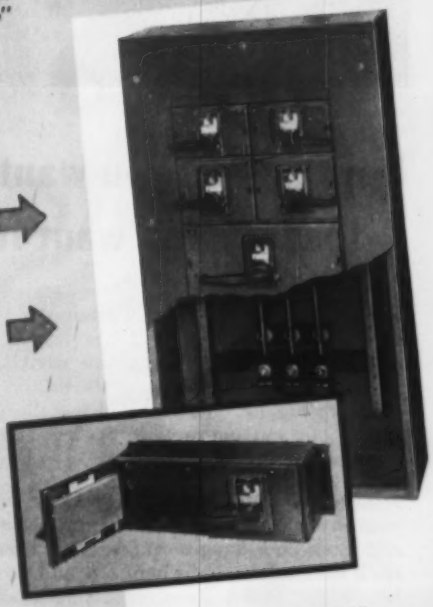
Three Simple Assembly Steps Fronts, with adjustable trim clamps, are available with or without doors.

With ALL these Quality Features

INTERIORS are flexible and adaptable to almost any service and voltage. Plug-in units and solid neutral can be changed simply and quickly.

BOXES provide generous wiring space.
FRONTS furnished with or without doors have adjustable trim clamps.

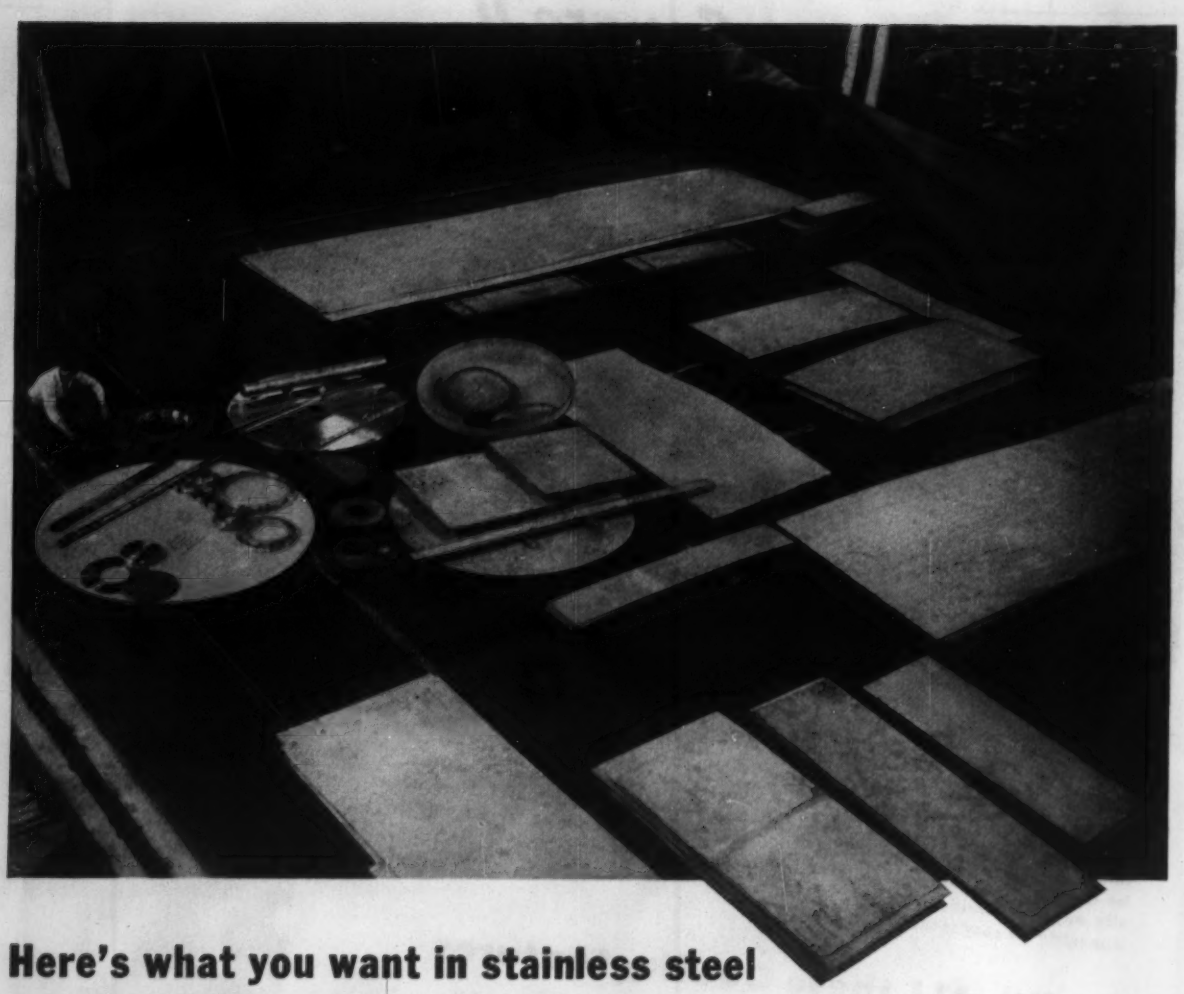
UNITS have quick-make, quick-break switch mechanism, visible blades and are horsepower rated. 30, 60, 100 and 200 ampere units are plug-in, while 400 and 600 ampere units are bolted to the bus.



•*Underwriters' Approved for Service Entrance*

ASK YOUR ELECTRICAL DISTRIBUTOR FOR SQUARE D PRODUCTS

SQUARE D COMPANY



Here's what you want in stainless steel —the way you want it

Stainless Steel Plate . . . produced to almost any size or thickness, 3/16" and heavier, in rectangles or cut-to-shape. Carlson maintains what is probably the largest stock of stainless plate in the country—produced to highest chemical and metallurgical standards —ready for cutting to your requirements, and for shipment when you want it.

Stainless Steel Heads . . . spun or press formed to your order or taken directly from our stock of ASME and Standard flanged and dished heads—the *largest stock* maintained anywhere. In addition to supplying heads for tanks, heat exchangers, condensers and similar equipment, Carlson can fill a complete bill of material including shell plates, flanges, rings, pads and other components.

Stainless Steel Forgings, Circles, Rings, and Special Patterns . . . Flanges, circles, rings, and sketch plates are cut from plate, or forged and rough machined to meet your specifications.

Stainless Steel Bars and Sheets (No. 1 Finish)

Complete Service . . . At Carlson the emphasis is on flexibility, efficiency and economy in producing what you want, when you want it. If you would like additional information about our service and products or, if you want *to place an order*—just let us know, we promise you prompt action!

write for CARLSON'S WEEKLY STOCK LISTS . . . YOUR GUIDE TO WHAT'S AVAILABLE IN QUALITY STAINLESS STEEL

Stainless Steels Exclusively

G. O. CARLSON, INC.

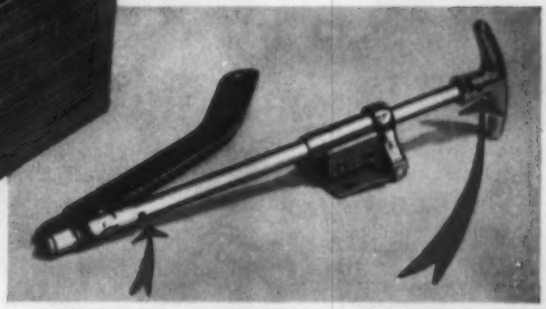
THORNDALE, PENNSYLVANIA

Plates • Plate Products • Forgings • Bars • Sheets (No. 1 Finish)

District Sales Offices in Principal Cities

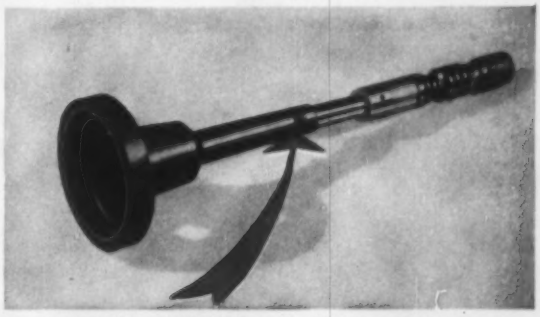
3 Better Methods with ROLLPIN

TO REPLACE A RIVET Rollpin's spring action firmly fastened radio transformer laminations in place and did two things a rivet couldn't do—aligned the laminations and compensated for minor hole variations.



TO REPLACE A STOP PIN Rollpin's self-locking action eliminated staking or peening operations required to retain a straight solid pin.

TO REPLACE A SET SCREW on automobile brake handle, Rollpin is self-retained in the hand grip but can easily be driven into over-drilled hole in shaft to free handle, then removed and used again.



TO REPLACE A DRIVING PIN for a flexible drive shaft on a washing machine, Rollpin cut assembly costs by eliminating precision drilling and reaming

Where can you use this simple fastener?

If you use locating dowels, hinge pins, rivets, set screws —or straight, knurled, tapered or cotter type pins, Rollpin offers the opportunity of a better method that can cut assembly and maintenance costs. This slotted tubular steel pin with chamfered ends eliminates special machining, tapping, and the need for precision tolerances. Driven into a hole drilled to normal production standards, it locks securely in place, yet can readily be drifted out and reused whenever necessary.

ELASTIC STOP NUT CORPORATION OF AMERICA

ROLLPIN TRADEMARK

MAIL COUPON FOR DESIGN INFORMATION

Elastic Stop Nut Corporation of America
Dept. R37-1160, 2330 Vauxhall Road, Union, N. J.

Please send the following free fastener information:

- ☐ Rollpin samples
- ☐ Rollpin bulletin
- ☐ Here is a drawing of our product. What self-locking fastener would you suggest?

Name _____ Title _____

Firm _____

Street _____

City _____ Zone ____ State _____

Operating around the clock on rugged application . . .

NEW G-E DC BRAKE REQUIRES ONLY

G-E DIRECT-CURRENT BRAKE installed on slab depiler at Jones & Laughlin. Brake has required no maintenance in first eight months of rugged duty. All settings and connections are made at one end of the brake.

GENERAL ELECTRIC

ONE ADJUSTMENT IN EIGHT MONTHS

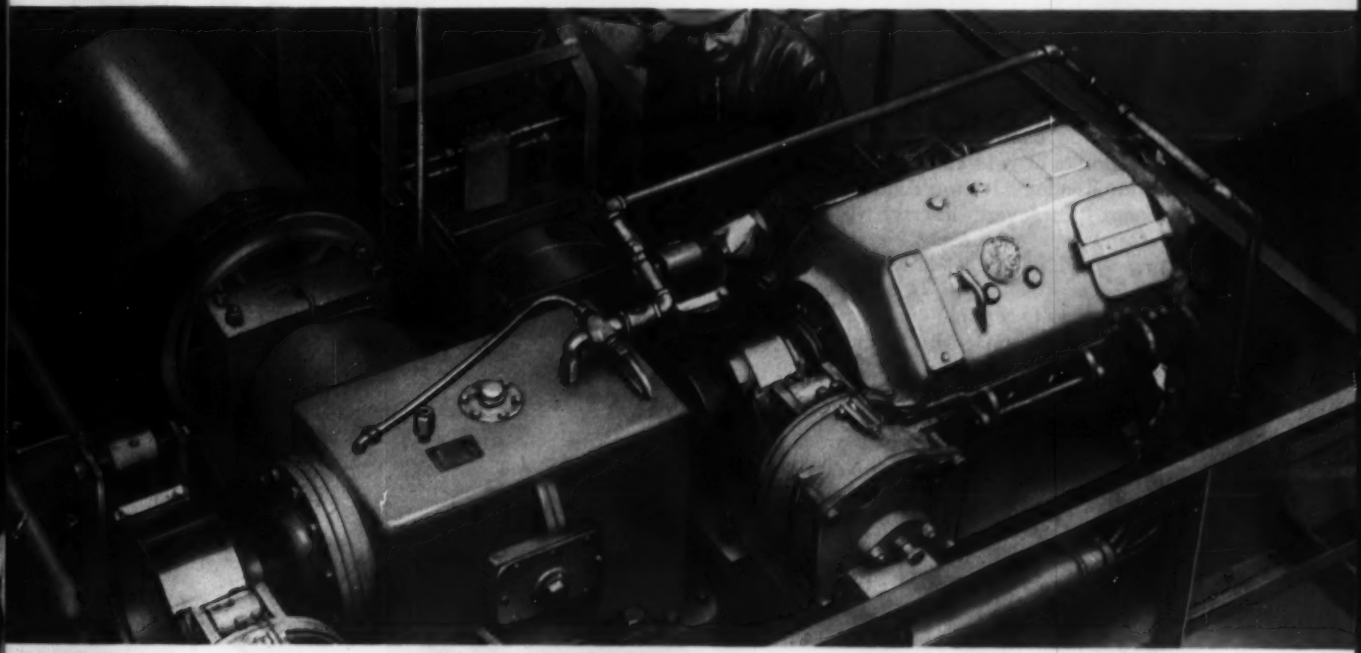
Normal compensation for lining wear at half-million operations only maintenance needed

In its first eight months of operation, a new General Electric direct-current brake has functioned with no faults and has required no maintenance or parts at Jones & Laughlin Steel Corporation, Cleveland Works Division. Only the recommended, normal adjustment for lining wear was made after half-million mark was reached. The brake is in use 24 hours a day on a slab depiling operation vital for continuous steel processing in the hot strip mill area of the plant.

Well satisfied with the brake's excellent performance, J&L specified three more General Electric DC brakes on a new 15-ton slab handling crane which recently went into service at their Cleveland Works. Rapid movement of the slabs with maximum safety for personnel are of vital importance to J&L's management and the G-E brakes are fulfilling these requirements.

The General Electric DC brake offers full-rated torque in the worn-gap position, (extra braking torque when you need it most) as well as features like single point adjustment, easily removable linings, armature-gap indicator, positive manual release, versatility of installation, and conformation to AISE Standards.

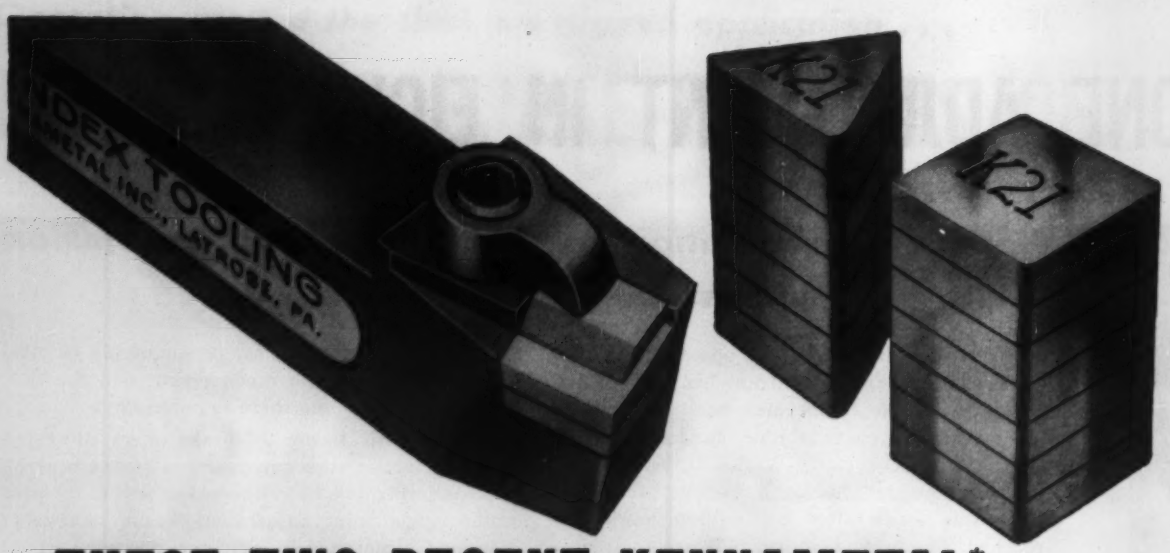
For more information about the General Electric direct-current brake contact your nearest G-E Apparatus Sales Office, or write for bulletin GEA-6214. Section 781-11, General Electric Company, Schenectady 5, New York.



SPECIFIED BECAUSE OF EXCELLENT PERFORMANCE by new G-E brake (opposite page), three G-E DC brakes were ordered by Jones & Laughlin for this 15-ton slab handling crane at the company's Cleveland Works.

Progress Is Our Most Important Product

GENERAL ELECTRIC



THESE TWO RECENT KENNAMETAL* DEVELOPMENTS HELP TO MEET TODAY'S HIGH-SPEED PRODUCTION NEEDS

The profit advantages of today's high-speed automatic cycling machines for metal cutting are lost when tools wear rapidly—need frequent regrinding—or are cumbersome to index.

Kennametal recently introduced two new developments to help give you continuous machine performance, and to help step up profits in your steel-cutting operations. These developments are Kendex*† Button Tooling and Kennametal Grade K21.

Kendex "turnover" inserts, with replaceable Kennametal shims and new chip control system, double the number of cutting edges, eliminate all regrinding and index in seconds. These features help provide consistent tool performance and hold downtime to a minimum.

Grade K21 is the General Purpose steel-cutting carbide now outperforming all other medium grades in the carbide industry. Superior performance of K21 is due to exceptionally high edge strength, strong resistance to cratering and superior wear qualities. An extremely versatile grade, K21 can be applied to general steel-cutting, heavy roughing and finishing.

Kendex, in 17 styles and sizes; and K21, in popular blanks and inserts, are immediately available from stock. For their right application on your machining jobs, call a Kennametal Tool Engineer. He works exclusively with Kennametal . . . applying and servicing it. And be sure to ask for reports of Kendex and K21 repeat performances, job after job. KENNAMETAL INC., Latrobe, Pa.

*Registered Trademark †Patent applied for 9403

PROVED BEST—TEST AFTER TEST

Kendex Tooling with "turnover" inserts cuts tool cost from $1.20 to $0.09 per piece, turning SAE 4140 tank assemblies.

Grade K21—on interrupted cutting, roughed and finished 6 times as many pieces as other premium carbide.

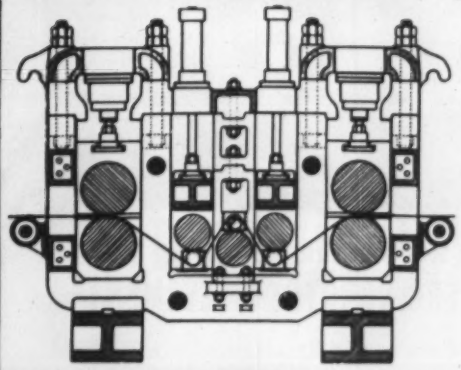
Give your machines the tools they deserve . . . the BEST

INDUSTRY AND **KENNAMETAL** *...Partners in Progress*

Y&M TRIPLE SCALE BREAKER

Speeds Pickling with the New

"YOUNGSTOWN"



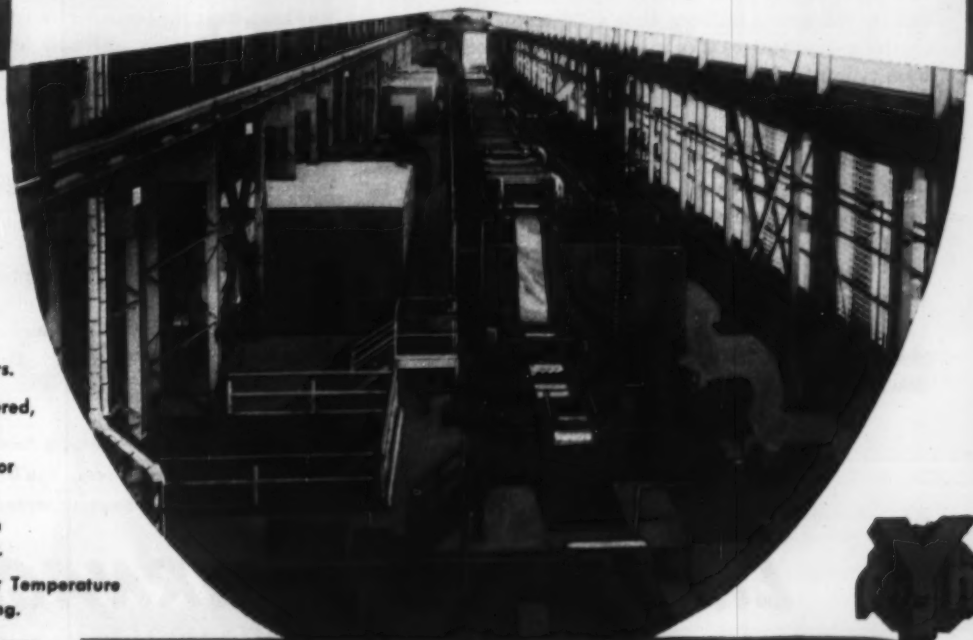
High Speed Continuous Strip Pickling Line

...Better Pickling with Less Acid and Lower Cost!

See our new, pull thru type, TRIPLE SCALE BREAKER, —a revolutionary improvement that eliminates the need for a Pinch Roll Stand in a modern Pickling Line. Investigate this and other new "YF&M" advantages. Whatever your pickling requirements,—complete new lines, revamping of existing lines, new tanks, rubber-covered rolls, Paralloy pinch rolls, any pickling line equipment,—get the benefit of our 70 years' experience. Consult "Youngstown" on how to speed up your pickling, cut acid consumption and make your operation more profitable.

features—

- Cone Type Payoff with Strip Opener.
- Triple Processor with Roller Leveller.
- Flash Welding and Mechanical Stitching.
- Pull-Thru Type Triple Scale Breaker.
- Single Cycle Up-Cut Shears.
- Heavy Duty Rubber Covered, Brick Lined Steel Tanks.
- Magnetic Loop Control for Acid Tanks.
- Fume Exhaust System —Roto Clone Scrubber.
- Automatic Control for Temperature and Acid Proportioning.
- Side Trimmer with Scrap Cutting or Balling
- Up-Coiler with Strip Oiling System.
- Entry and Exit Coil Conveyors.



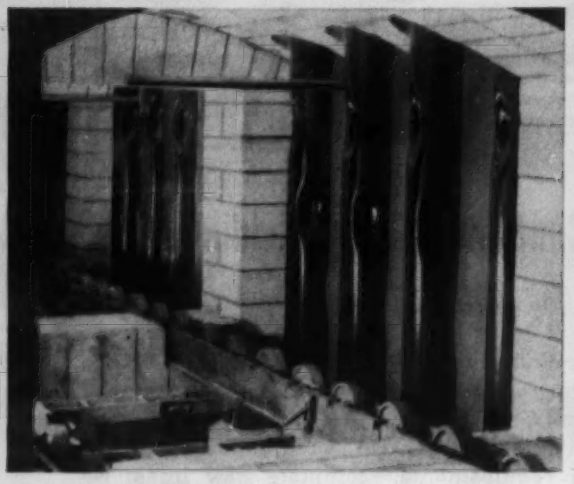
The Youngstown Foundry & Machine Co.

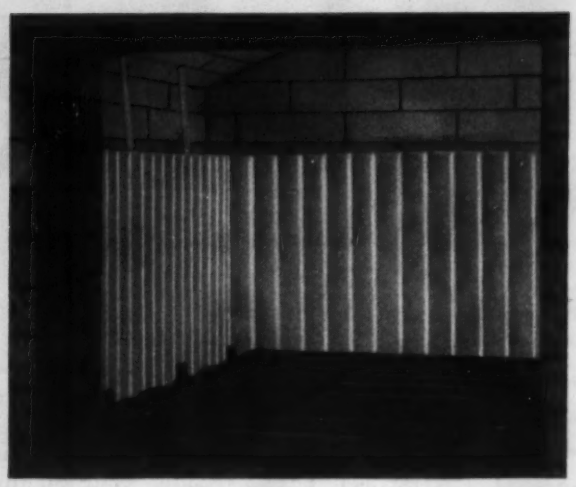
SERVING INDUSTRY SINCE 1885

Youngstown, Ohio

Whatever your source of heat...

LINDBERG HEAT TREATING FURNACES OFFER THESE EXCLUSIVE ADVANTAGES





. . . IN THE GAS-FIRED FURNACE
NEW LINDBERG VERTICAL RADIANT TUBE

Because of its revolutionary design, this tube provides a new level of gas-fired furnace performance. The secret lies in the new Lindberg tube's "dimples." The tube carries a central stream of mixed air-and-gas surrounded by a cylindrical stream of air alone. Combustion occurs in the area between these two streams. The "dimples" create eddies accelerating combustion and maintaining even temperatures along the entire tube.

This Lindberg tube will operate at maximum efficiency for a longer period of time. The special protective coating gives greatest possible resistance to carbon penetration. Vertical position eliminates soot deposit and resultant temperature increases at points of sooting.

Tubes are 59 inches long, weigh only 29 pounds, changeable in a few minutes. No costly furnace shutdowns nor high labor and material cost for tube changes.

. . . IN THE ELECTRIC FURNACE
NEW LINDBERG CORRTHERM ELEMENT

CORRTHERM, Lindberg's radically advanced new electric heating element offers advantages never before available for heat treating furnaces. With this new element carburizing and carbonitriding with electricity becomes practical, efficient and economical. Ideal, too, in other types of Lindberg electric furnaces.

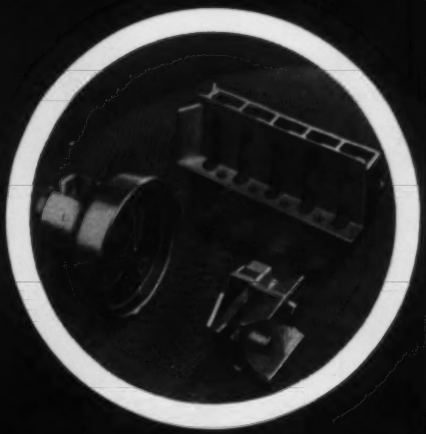
The outstanding feature of the CORRTHERM element is the extremely low voltage at which it operates. Consequently, leakage through carbon saturation and shock or short hazards are eliminated. Elements also act as baffles to direct circulation of convection streams.

CORRTHERM elements are practically indestructible. Work load or operator's charging tool can't hurt them. Watts density is at all time low. Easily installed or replaced, too, as element merely hangs in furnace and no complicated mountings are required.

Lindberg Field representatives in 21 cities are ready to show you how Lindberg furnaces with these revolutionary new elements can improve your heat treating process. You'll find your Lindberg representative's name in the classified section of the phone book or write us direct.

LINDBERG FURNACES

LINDBERG ENGINEERING COMPANY
2441 W. Hubbard Street • Chicago 12, Illinois



Titan brass pressure die castings

Titan brass and bronze forgings

Titan brass and aluminum hand screw machine parts

One of Titan's modern automatic chucking machines for preparing brass and aluminum forgings to customer specifications. Titan performs all types of machining operations.

Accurately machining a Titan forging on a turret lathe. Titan fabricating operations cut customers' assembly costs.

Titan machined parts

have sparkle, economy and versatility

Appeal and usefulness of brass or aluminum forgings and pressure die castings are increased greatly by multiple drilling, reaming, tapping, gang-milling, turning, broaching or knurling at the skilled hands of Titan machinists.

Equipment includes turret lathes and automatic chucking machines for producing finished machine parts of volume, quality, economy and superb finish. For example, high-quality forgings are supplied by Titan ready for assembly—already precision-broached and gang-milled with multiple-drilled and tapped holes.

When smaller quantities of fabricated parts are needed, Titan hand screw machine facilities come into play. Here, holding to closest tolerances and precision requirements is regular practice.

Let us suggest how Titan machined parts may solve your assembly problems and cut costs. Write for more information. And send for new 40-page full-color booklet "Behind the Scenes." Use the coupon below.

Titan

METAL MANUFACTURING COMPANY

Bellefonte, Pa. Offices and Agencies in Principal Cities

Dept. C

Titan Metal Manufacturing Co., Bellefonte, Pa.

Gentlemen: Please send 40-page booklet "Behind the Scenes."

Name_____

Title_____

Company_____

Street_____

City & State_____

for KING-SIZE savings

specify Wheelabrator® Steel Shot

All abrasives look pretty much alike . . . but the way they perform is another story. Abrasive costs vary all over the lot. The only thing that doesn't change is the fact that Wheelabrator Steel Shot costs less to use than ANY OTHER ABRASIVE. It is the KING SIZE BUY.

Compare it to chilled iron. The savings are tremendous. Compare it to a malleablized abrasive. The savings are almost as great. Compare it to cut wire or to other steel shots. Wheelabrator Steel Shot still gives KING SIZE SAVINGS. It gives you these savings because it is produced to give KING SIZE PERFORMANCE. No other abrasive has such consistent hardness from pellet to pellet. No other abrasive has such uniform microstructure.

For KING SIZE SAVINGS, always specify Wheelabrator Steel Shot.

WRITE TODAY FOR BULLETIN 89-B

Wheelabrator® Steel Shot Is Built for Peak Performance

1. Only Wheelabrator Steel Shot is produced to such exacting standards.
2. Only Wheelabrator Steel Shot is so carefully controlled for uniform quality.
3. Only Wheelabrator has such complete facilities for shot production.
4. Only Wheelabrator Steel Shot has a continuous pilot plant operation for research and development.

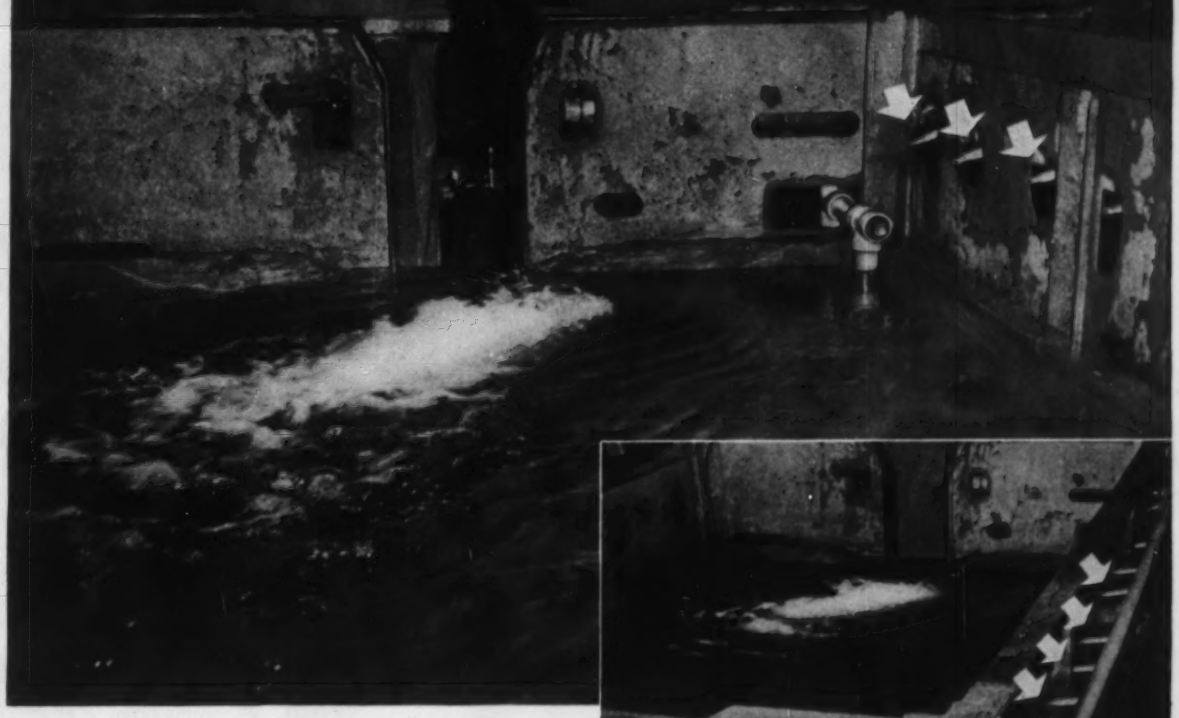
WHEELABRATOR
CORPORATION

(Formerly American Wheelabrator & Equipment Corp.)

509 S. Byrkit St., Mishawaka, Indiana

Trail Blazer of Industrial Progress

FOR AN ACID CONDITION, THERE'S NOTHING LIKE
U. S. Uscolite Plastic Pipe



Uscolite nozzles (arrows) are used to wash acid off steel stock.

Close-up of Uscolite pipe which carries water to the Uscolite nozzles (arrows). The tanks are lined with U. S. corrosion-resistant Permobond rubber lining.

A large manufacturer of wire and cable in New England is one of the many who find U. S. Uscolite® Pipe immune to acid conditions. "Uscolite is the most effective material we have found for this service," says the management of the plant. Uscolite pipe and Uscolite nozzles are used to wash off acid after cable and wire are immersed in pickling baths —for two big reasons:

(1) Uscolite is immune to corrosion from the splash-drip and spray off the steel stock as it comes from the pickling bath.

(2) Uscolite nozzles not only last far, far longer than metal nozzles, but they also require no clean-out.

Uscolite piping is a product of United States Rubber Company. Both its interior *and* exterior are resistant to acids, salts, alkalies, gases. Despite Uscolite's great impact strength, it is surprisingly light in weight. You can also order it in pipe fittings and valves.

Whether ordering completely new piping, or getting replacements, specify U. S. Uscolite. Get in touch with any of the 27 "U. S." District Sales Offices, or write address below.

Uscolite pipe and fittings are made in the broadest and largest line of stock sizes on the market. Sizes follow:

● Molded fittings in ½" through 4" I.P.S. ● Molded flanges ½" to 6" I.P.S. ● ½" to 3" Uscolite diaphragm valve (Hills-McCanna). ● Pipe in standard wall dimensions and extra heavy wall dimensions in ½" through 6" pipe sizes.

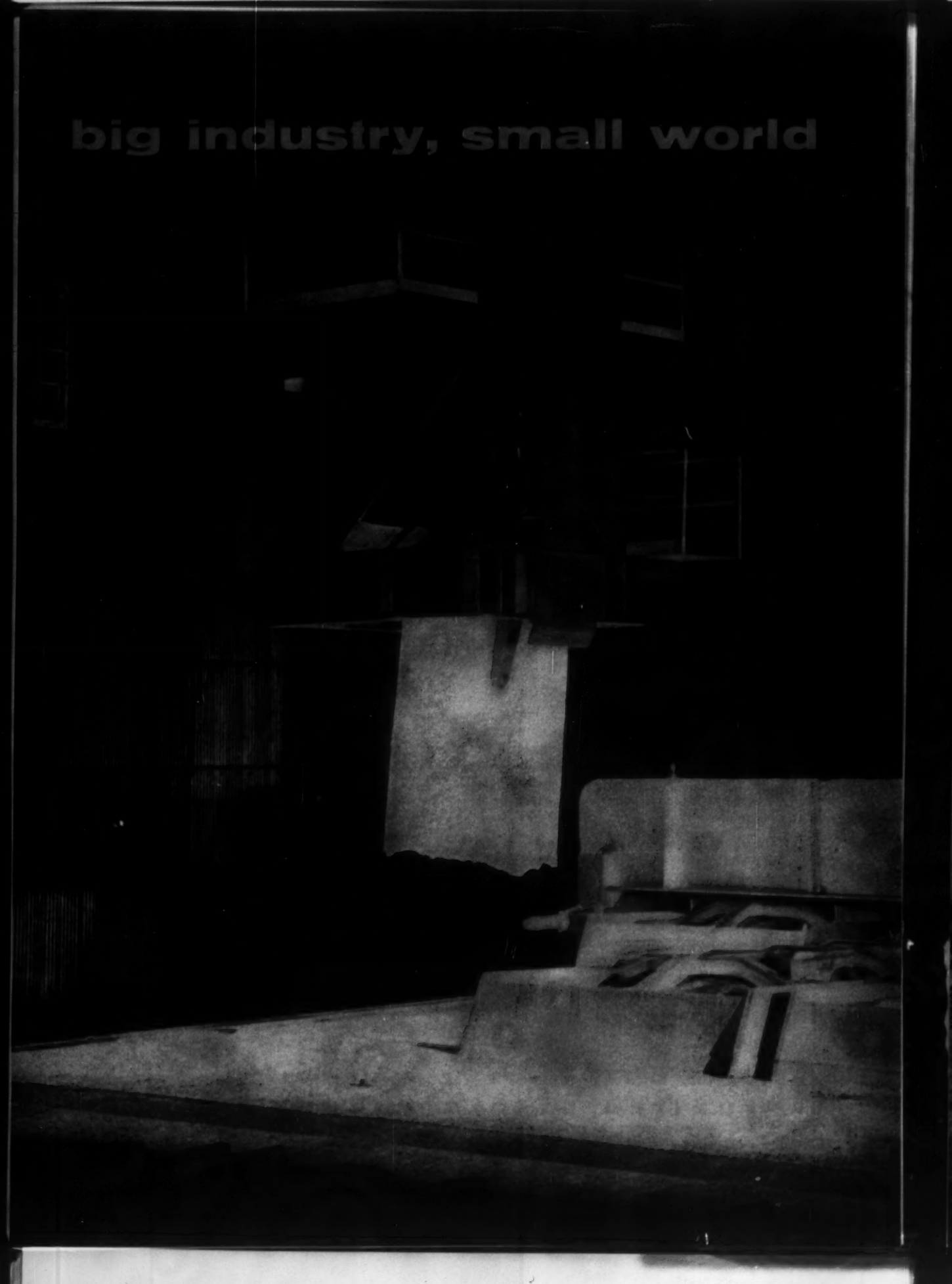
"U.S." Research perfects it..."U.S." Production builds it...U.S. Industry depends on it.

UNITED STATES RUBBER COMPANY

MECHANICAL GOODS DIVISION · ROCKEFELLER CENTER, NEW YORK 20, N. Y.

Hose • Belting • Expansion Joints • Rubber-to-metal Products • Oil Field Specialties • Plastic Pipe and Fittings • Grinding Wheels • Packings • Tapes Molded and Extruded Rubber and Plastic Products • Protective Linings and Coatings • Conductive Rubber • Adhesives • Roll Coverings • Mats and Matting

big industry, small world



annealing covers
billet reheating furnaces, continuous
carbon restoration and annealing furnaces, continuous
controlled atmosphere generators
high-speed stress relieving furnaces
one-way fired soaking pits
pit-type annealing furnaces
slab and billet heaters, continuous
strip annealing furnaces, continuous
strip galvanizing lines, continuous
wire patenting furnaces, continuous

Wherever this steel goes—from first soak to final shipping dock—it will find that the big steel industry is a small world as far as 'Surface' equipment is concerned. Somewhere along the line, whatever its destined shape, the steel will be made more workable and more useful in 'Surface' furnaces.

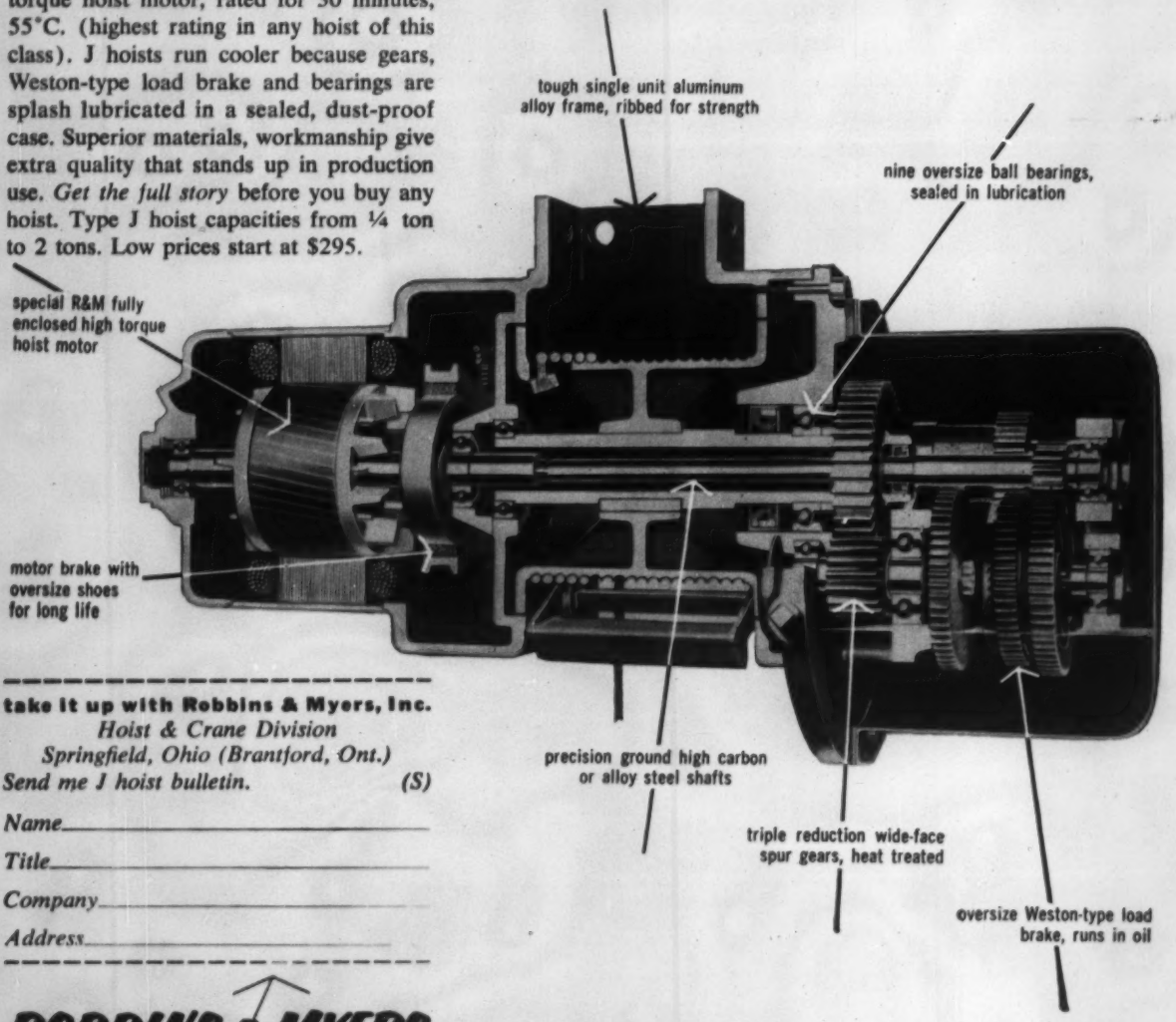
Why is it so easy to bump into 'Surface' in steel mills? One reason is that 'Surface' has literally grown up with the steel industry. A better reason is the confidence that steelmakers have in the performance of furnaces and generators manufactured by Surface Combustion Corp., Toledo 1, Ohio.

Surface
STEEL MILL FURNACES

British Furnaces, Ltd., Chesterfield; Stein & Atkinson, Ltd., London
Stein & Roubaix, Paris, Leige, and Genoa; Chuzai Ro Kogyo Kaisha, Ltd., Osaka
Benno Schilde Maschinenbau, A.G., Bad Hersfeld (Hessen, Germany)

R&M J hoists give you the biggest quality lifting package at a reasonable cost, and here's why: First, there's no compromise on material—high strength carbon or alloy steel shafts and gears; tough, flexible plow steel cable; oversize bearings, load brake, and shafts—all last longer under punishing loads. No compromise on workmanship, either—each of the triple reduction spur gears is wide-faced, precision cut and heat treated; the motor is R&M's own high torque hoist motor, rated for 30 minutes, 55°C. (highest rating in any hoist of this class). J hoists run cooler because gears, Weston-type load brake and bearings are splash lubricated in a sealed, dust-proof case. Superior materials, workmanship give extra quality that stands up in production use. *Get the full story* before you buy any hoist. Type J hoist capacities from ¼ ton to 2 tons. Low prices start at $295.

buy value you can see


tough single unit aluminum alloy frame, ribbed for strength
nine oversize ball bearings, sealed in lubrication
special R&M fully enclosed high torque hoist motor
motor brake with oversize shoes for long life
precision ground high carbon or alloy steel shafts
triple reduction wide-face spur gears, heat treated
oversize Weston-type load brake, runs in oil

take it up with Robbins & Myers, Inc.
Hoist & Crane Division
Springfield, Ohio (Brantford, Ont.)
Send me J hoist bulletin. *(S)*

*Name*_____

*Title*_____

*Company*_____

*Address*_____

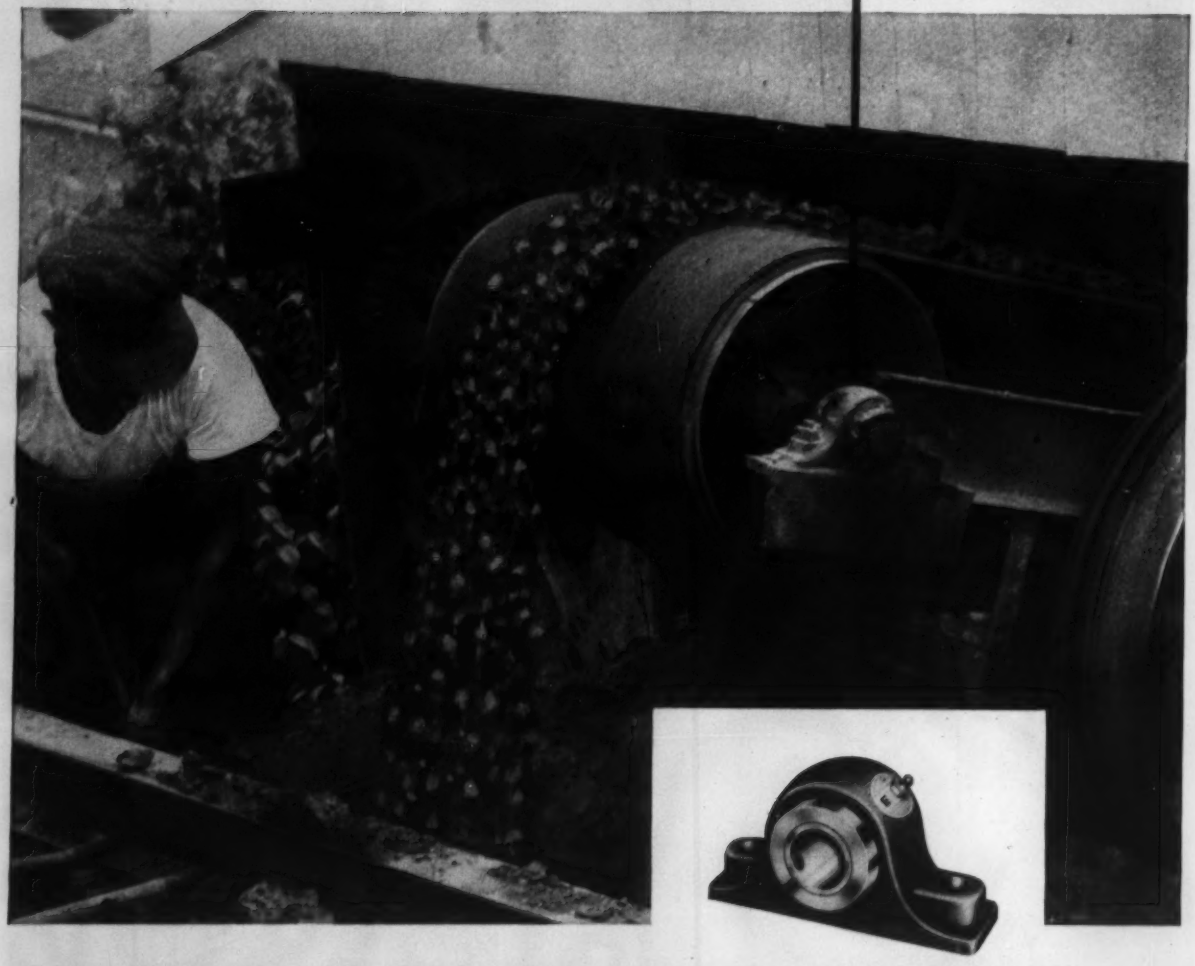
ROBBINS & MYERS **hoists • cranes • winches**

WE FILTER OUT THE IRRITANTS
Spring
BLEMS
WALLACE BARNES COMPANY
BRISTOL, CONNECTICUT
THE WILLIAM D. GIBSON COMPANY
1800 CLYBOURN AVE. CHICAGO 14,
RAYMOND Manufacturing COMPANY
CORRY, PENNSYLVANIA
BARNES-GIBSON-RAYMOND
40300 PLYMOUTH RD. PLYMOUTH, MICH.
B·G·R COOK PLANT
ANN ARBOR MICHIGAN
DIVISIONS OF ASSOCIATED SPRING CORPORATION
COAST TO COAST
SEABOARD Coil Spring Div.
15001 S. BROADWAY GARDENA, CALIF.
OHIO DIVISION
1825 EAST FIRST ST. DAYTON, OHIO
WALLACE BARNES COMPANY
STATE FAIR BLVD. SYRACUSE 9 (Salina), N.Y.
MILWAUKEE DIVISION
341 E. ERIE ST. MILWAUKEE, WIS.
DUNBAR BROTHERS COMPANY
BRISTOL, CONN.
F. H. MAHROSS AND SONS CO.
BRISTOL CONNECTICUT
THE WALLACE BARNES CO., LTD.
HAMILTON CANADA

COMPLETELY ASSEMBLED
FACTORY ADJUSTED
PRE-LUBRICATED

SEALED

—ready to mount on the shaft!



DODGE-TIMKEN *America's Quality Pillow Block*

Extra measures are taken to build superior quality into Dodge-Timken Bearings; and extra precautions are taken to keep that quality *intact*—from the factory to distributor to you to your machines.

These bearings are sealed in manufacture—an integral part of Dodge-Timken design. Their inbuilt precision is protected *both on and off the shaft.* That is one reason why they easily deliver a minimum of 30,000 hours of service. Want evidence? Look around you. No other pillow block is so widely used on the nation's tough jobs. Dodge-Timken dependability has been proved in *millions* of installations.

There are 5 types of Dodge-Timken Pillow Blocks for all types of service, in shaft sizes from 1 3/16" to 10". Also Dodge-Timken Hanger Bearings, Flange Bearings, Take-ups.

DODGE MANUFACTURING CORPORATION, 4400 Union St., Mishawaka, Indiana

DODGE
of Mishawaka, Ind.

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on new, cost-saving methods. Look for his name under "Power Transmission Machinery" in your classified telephone directory, or write us.

USS GERRARD

ties anything you've ever seen

Assembly-line strapping of cartons of Allis-Chalmers engine parts with USS Gerrard Round Steel Strapping and the Model Q machine.

A tractor packaged for export shipment, being reinforced with a diagonal tie of USS Gerrard Round Steel Strapping.

Allis-Chalmers engine blocks, 24 to a pallet, being reinforced for shipment with USS Gerrard Round Steel Strapping. Pallet weighs 4,000 pounds.

Allis-Chalmers Manufacturing Company, Tractor Works, West Allis, Wis., reinforces packages of all sizes quickly, securely, and inexpensively with USS GERRARD ROUND STEEL STRAPPING

When Allis-Chalmers West Allis, Wis., Tractor Works began packaging replacement parts in cartons to improve its shipping operation, USS Gerrard Round Steel Strapping was chosen as reinforcement. As a result, it provides a neat, inexpensive way to close cartons quickly, protects the product, saves the carton for re-use, and displays the advertising on the box continuously.

Allis-Chalmers is using USS Gerrard Round Steel Strapping to secure packages which vary from 4-inch-square boxes, weighing less than a pound, to huge 38" x 30" x 34½" cartons which weigh up to 3,000 pounds. Even complete tractors are disassembled and crated for export to reduce cubage charges. They, too, are reinforced with USS Gerrard Round Steel Strapping.

Take a tip from a highly successful organization, and try USS Gerrard Steel Strapping — Round or Flat. Whatever your packaging-tying problem might be, our engineers can help you find the safest, most economical solution. Contact us now.

GERRARD STEEL STRAPPING DIVISION, UNITED STATES STEEL CORPORATION
GENERAL OFFICES: CHICAGO, ILLINOIS

USS GERRARD STEEL STRAPPING
Round and Flat

UNITED STATES STEEL

SEND FOR THIS NEW BOOKLET NOW

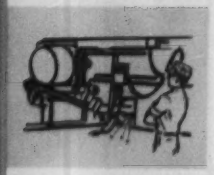
Gerrard Steel Strapping
4745 South Richmond St., Chicago 32, Ill.

Please send me, free of charge, the new 36-page GERRARD Blue Book of Packaging.

Name .....
Company .....
Address .....
City ..... State.....

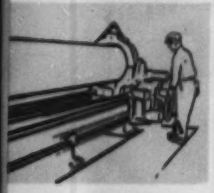
Versatile from Beginning to End

ACIPCO *Centrifugally Spun* STEEL TUBES



Casting

Heat Treating



Machining

Fabricating

Testing and Inspection

ACIPCO's complete, integrated facilities produce quality steel and alloy iron tubes for hundreds of end product applications

This aerial view shows the American Cast Iron Pipe Company's plant at Birmingham, Alabama. Excellent rail and truck transportation is readily accessible.

ACIPCO centrifugally spun steel tubes are serving hundreds of quality-conscious and cost-conscious manufacturers. For example, in applications as varied as these shown here, high quality ACIPCO steel tubes are proving that they offer unusual economy, and long-time service . . . plus versatility in end uses.

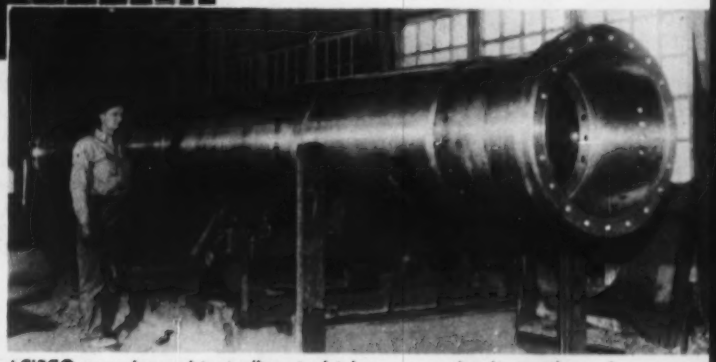
If you use steel tubes — no matter what the application — centrifugally spun steel tubes produced by ACIPCO will offer you these and many other advantages.

With no obligation or cost let ACIPCO's experienced engineers and metallurgists explain how ACIPCO steel tubes may serve you better . . . from beginning to end.

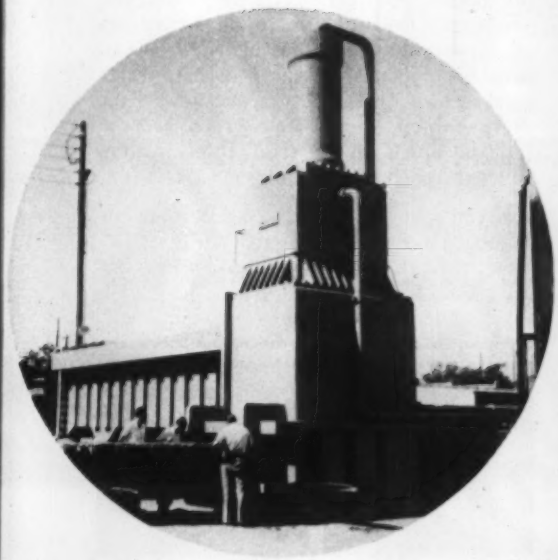
ACIPCO's flexible, integrated operations permit prompt delivery of centrifugally spun steel tubes of any standard or special non-standard analysis cast in a wide range of sizes. They are produced with any desired degree of finish, in large or small quantities. ACIPCO's extensive casting, heat treating, machining, fabricating and testing and inspection facilities — all "under one roof" — provide versatile, "one-stop" service.

AMERICAN
CAST IRON PIPE CO.
Special Products Division
BIRMINGHAM 2, ALABAMA

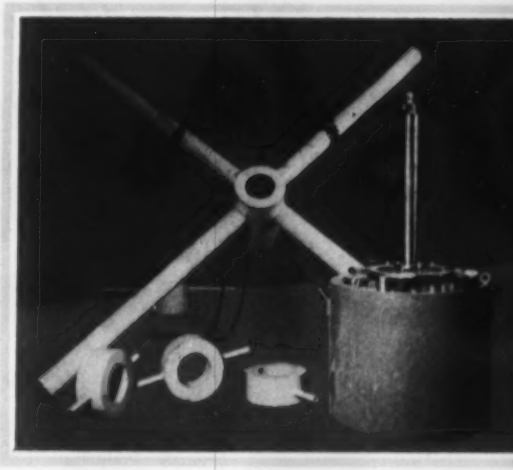
ACIPCO heat resistant alloy steel tubes possess exceptionally high strength values, scale resistance and excellent creep strength properties, and give outstanding service even at extreme temperatures. Shown here are ACIPCO heat resistant alloy steel tubes designed for service as retorts for magnesium reduction and operation at 2150°F.

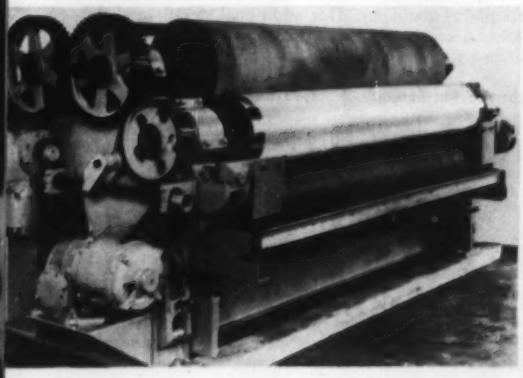


ACIPCO corrosion resistant alloy steel tubes are serving in countless industrial applications. Here is a large stainless steel retort produced for a chemical manufacturer. This retort was fabricated at ACIPCO from steel tubes welded to statically cast end sections.



Gatherer cylinder for world's largest scrap metal baling press, manufactured by the Harris Foundry & Machine Company, was fabricated from ACIPCO steel tubes. ACIPCO centrifugally spun tubes are especially suited for hydraulic cylinder applications because of their high strength non-directional mechanical properties.





ACIPCO steel tubes possess superior qualities of dimensional stability and dynamic balance. They offer exceptional service as paper mill, printing, engraving, textile, steel mill and many other types of low, medium or high speed rolls.

50th ANNIVERSARY
ACIPCO
1905 1955

In an unusual application, ACIPCO steel tubes form a "dummy" propeller for testing a balancing device for the armed forces. Despite the short time in which the tubes were required and the small quantity needed, considerable time and money were saved by the manufacturer by using ACIPCO tubes. Photo courtesy Guaranteed Welding Engineering Company.

DISTRIBUTORS

Austin-Hastings Co., Inc.
226 Binney Street
Cambridge 42, Massachusetts

Lyman Tube & Bearings, Ltd.
920 Ste. Sophie Lane
Montreal 3, Canada

Peter A. Frasse and Co., Inc.
17 Grand Street
New York 13, New York

J. M. Tull Metal & Supply Co.
285 Marietta Street, N.W.
Atlanta, Georgia

Ducommun Metals and Supply Co.
4890 South Alameda Street
Los Angeles 54, California

Strong, Carlisle & Hammond Co.
1392 West Third Street
Cleveland 13, Ohio

C. A. Roberts Company
2401 Twenty-fifth Avenue
Franklin Park, Illinois

Set them, forget them—they stay tight
New high-torque Unbrako self-locking socket set screws

Research has proved that the tighter you seat a set screw the better it works. So we designed a set screw that can be tightened tighter than ever before. We formed a deeper socket. We put a radius in the socket corner. We developed fully formed threads. We established new methods of heat treatment in atmosphere-controlled furnaces. All this, plus the well-known self-locking knurled cup point that keeps it tight.

Let's see what the changes in the UNBRAKO socket mean to you. The deeper socket gives you more purchase with the wrench. Since more wrench can be put in the socket, you can tighten the screw much tighter. And you won't ream the socket or round the corners of the wrench. The radius in the UNBRAKO corners eliminates the sharp corners where cracks start. Ordinary socket screws have sharp corners which often crack even at torques much lower than those recommended for UNBRAKOs.

You can't buy a better set screw than an UNBRAKO. See your authorized industrial distributor today. Or write STANDARD PRESSED STEEL CO., Jenkintown 33, Pa.

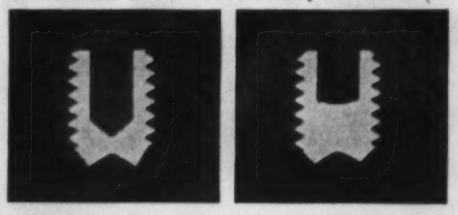
Up to 40% higher tightening torque— a new Unbrako feature

RECOMMENDED SOCKET SET SCREW TIGHTENING TORQUES (Inch-Pounds)

SCREW SIZE	UNBRAKO	SET SCREW B	SET SCREW C	MINIMUM DIFFERENTIAL %
#4	5	3.9	3.5	28
#5	9	7.8	7.4	15
#6	9	7.8	7.4	15
#8	20	14.7	14.5	36
#10	33	26.5	25	25
1/4	87	62	60	40
5/16	165	122	125	32
3/8	290	198	225	29
7/16	430	309	350	23
1/2	620	460	500	24
5/8	1225	1106	1060	11
3/4	2125	1540	1800	18
7/8	5000	3660	4600	9
1	7000	5025	6500	8

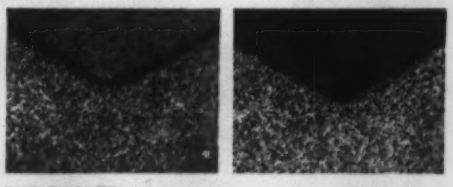
ALL UNBRAKOs can withstand higher tightening torques than ordinary socket set screws. For example, the recommended torque for a ¼" UNBRAKO is 87 inch-pounds—40% greater than that recommended for an ordinary socket set screw.

Unbrako Set Screw **Ordinary Set Screw**



COMPARE the socket depth. The UNBRAKO socket at the left is much deeper than the socket in the ordinary set screw at the right. This additional depth in the UNBRAKO socket gives you more purchase with the wrench—you can set an UNBRAKO much tighter.

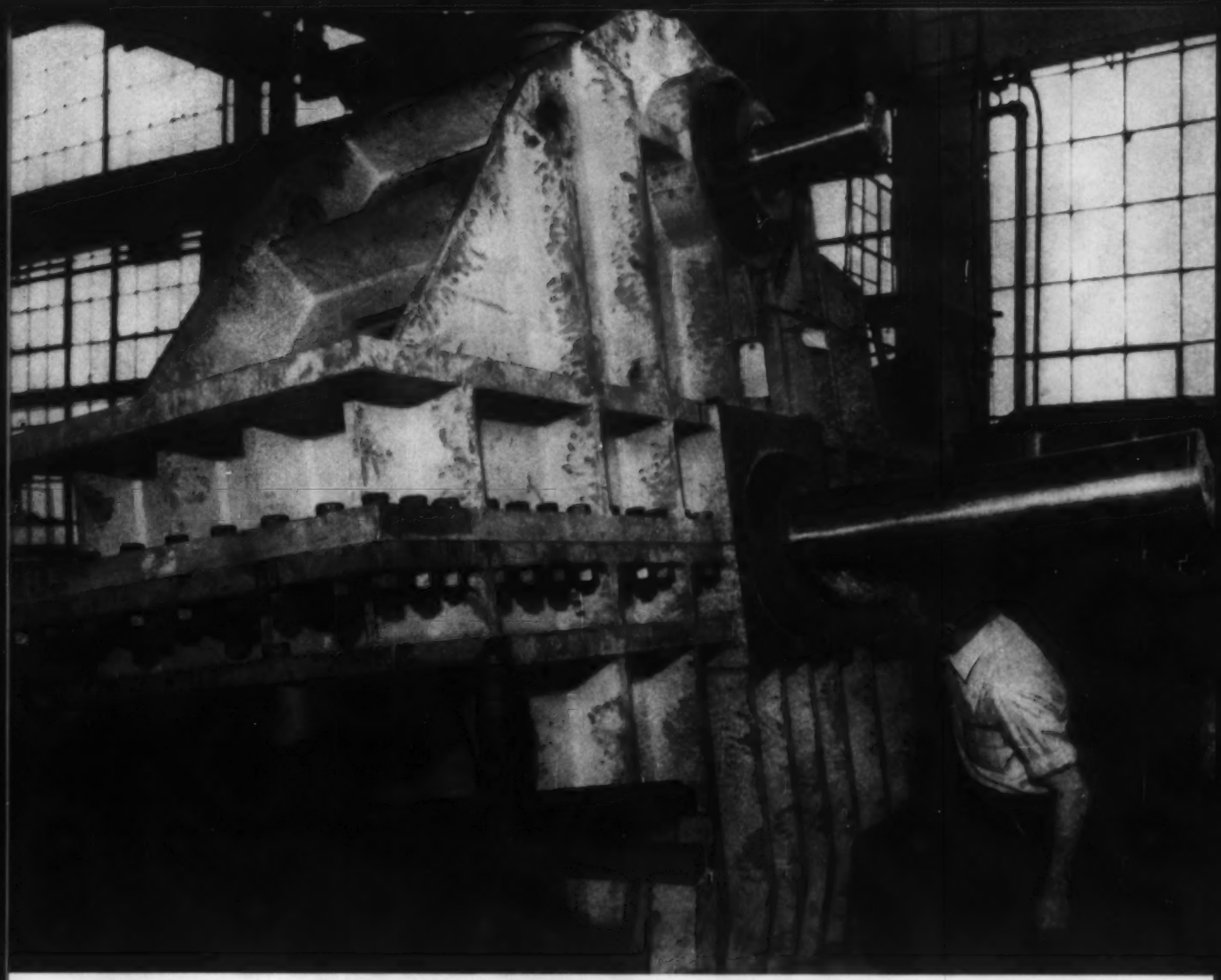
Unbrako Set Screw **Ordinary Set Screw**



THE RADIUS put in UNBRAKO socket corners eliminates the sharp corners where cracks start. They distribute the stresses developed when tightening torques are applied. You can seat an UNBRAKO tighter without screw failure. Ordinary set screws have sharp corners which often crack when tightened even at lower recommended torques.

STANDARD PRESSED STEEL CO.

UNBRAKO SOCKET SCREW DIVISION SPS JENKINTOWN PENNSYLVANIA



Westinghouse Gearing Division improves speed reducer performance with SSW forged steel shafts

Two Standard Steel forged steel shafts are important components of this speed reduction unit required to drive a seamless tube piercing mill. Built and set up for tests by the Gearing Division of Westinghouse Electric Corporation, Pittsburgh, SSW shafts (output and input) were selected for their more uniform *internal structure and closely controlled analysis*. They know these inherent features will contribute to higher-quality . . . longer-lasting . . . failure-resisting performance.

Westinghouse also found this structural uniformity enabled them to machine finish on site the high-speed output shaft simply and easily.

You too can improve your product, get better over-all performance and operation by specifying and standardizing on Standard Steel forgings.

Dept. B646, Standard Steel Works Division
Baldwin-Lima-Hamilton Corporation, Burnham, Pa.

Please send me new Standard Steel Works folder containing detailed information on "How forged weldless rings and flanges improve your product and cut your costs."

Name_____ Title_____

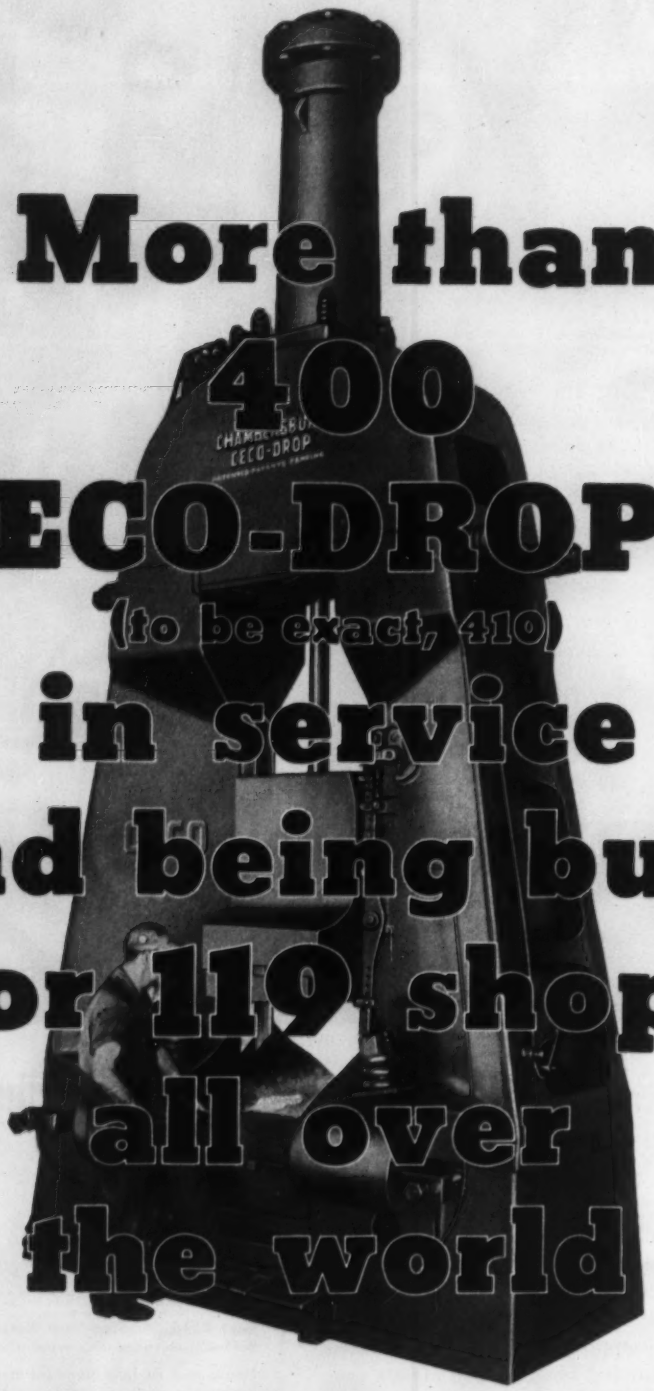
Company_____

Address_____

City_____ Zone____ State_____

BALDWIN BLH LIMA-HAMILTON

Standard Steel Works Division
BALDWIN-LIMA-HAMILTON



More than 400 CECO-DROPS (to be exact, 410) in service and being built for 119 shops all over the world

The piston-lift gravity drop hammer with short stroke control

CHAMBERSBURG

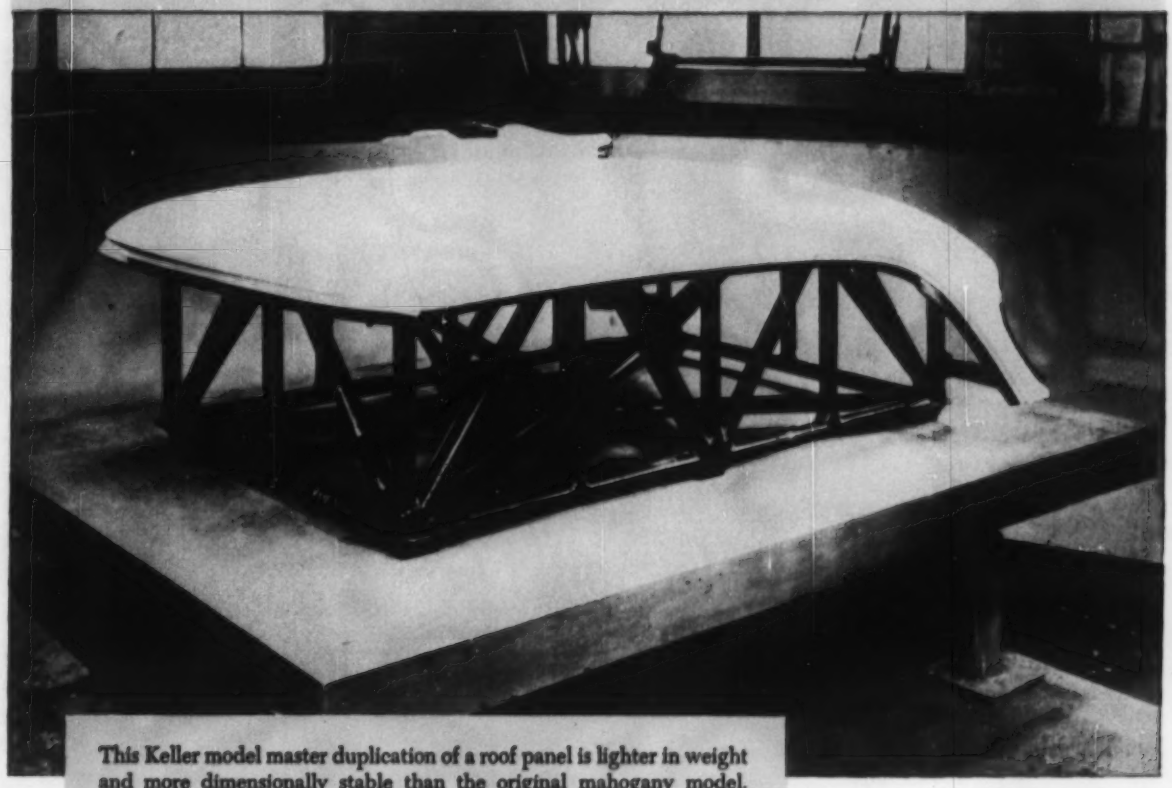
THE HAMMER BUILDERS

CHAMBERSBURG ENGINEERING CO. — Builders of THE IMPACTER "FORGING IN MID-AIR" — CHAMBERSBURG, PENNSYLVANIA

Make tools faster, more dimensionally stable

WITH COMPOUNDS BASED ON BAKELITE EPOXY RESINS

TRADE-MARK



This Keller model master duplication of a roof panel is lighter in weight and more dimensionally stable than the original mahogany model. It's made from plastic tooling compounds based on BAKELITE Epoxy Resins and produced by **Ren-ite Plastics, Inc.**, Lansing 4, Mich.

Metalworking tools cost less when they're made with BAKELITE Brand Epoxy Resins. Compared with conventional materials, these compounds offer quick, easy production, plus these advantages:

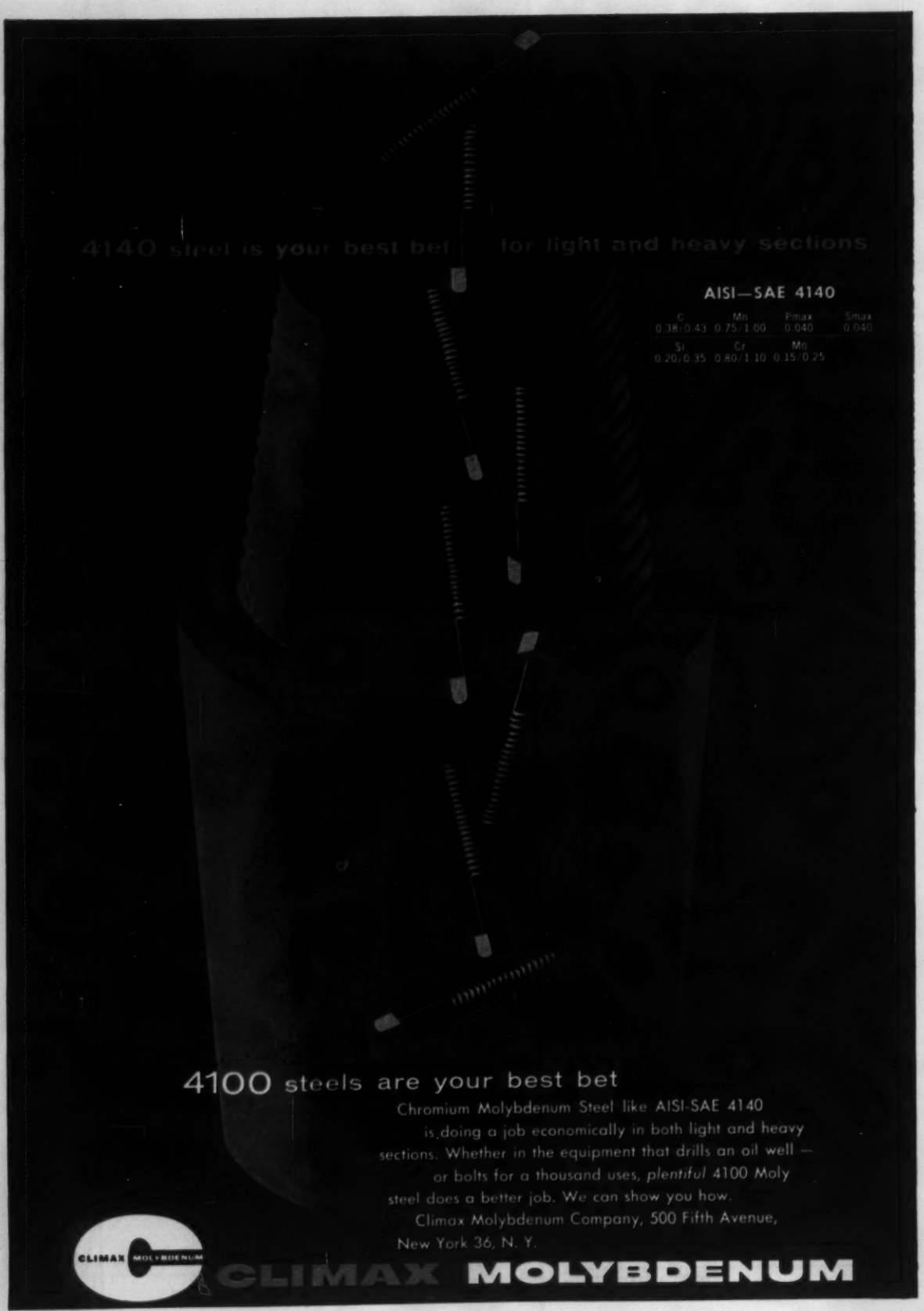
- Liquid compounds—can be cast to shape without pressure
- Cured at room temperature—no applied heat
- Minimum shrinkage—minimum finishing
- Excellent flexural, compression, and impact strengths
- Outstanding dimensional stability
- Lighter weight that means easier handling
- Laminated with glass cloth to form jigs, spotting racks, fixtures and Keller models.

For more information, write Dept. JZ-172.

BAKELITE BRAND EPOXY RESINS

BAKELITE COMPANY, *A Division of Union Carbide and Carbon Corporation* UCC 30 East 42nd Street, New York 17, N. Y.

The term BAKELITE and the Trefoil Symbol are registered trade-marks of UCC


4140 steel is your best bet for light and heavy sections
AISI—SAE 4140
C
0.38/0.43
Mn
0.75/1.00
Pmax
0.040
Smax
0.040
Si
0.20/0.35
Cr
0.80/1.10
Mo
0.15/0.25
4100 steels are your best bet
Chromium Molybdenum Steel like AISI-SAE 4140 is doing a job economically in both light and heavy sections. Whether in the equipment that drills an oil well — or bolts for a thousand uses, plentiful 4100 Moly steel does a better job. We can show you how.
Climax Molybdenum Company, 500 Fifth Avenue, New York 36, N. Y.
CLIMAX MOLYBDENUM
CLIMAX MOLYBDENUM

WILLIAMS-WHITE GANTRY PRESSES

for Large or Small Straightening Operations

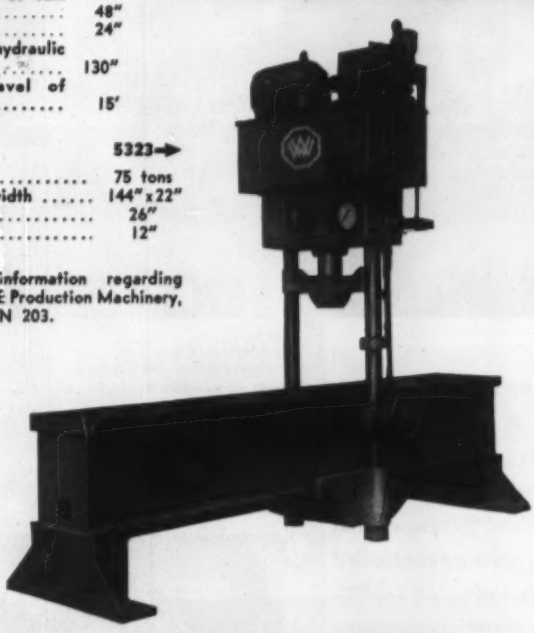
The two presses shown illustrate the versatility of gantry type design and construction as applied to WILLIAMS-WHITE hydraulic straightening presses.

A WILLIAMS-WHITE Gantry Type, Hydraulic Press can be built to your specifications for operations as diversified as straightening heavy plate or weldments (photograph 5500) or production bending and straightening operations (photograph 5323).

	5500→
Capacity	400 tons
Working face of bed, R-L, F-B	20' x 13'
Daylight, bottom of ram to bed	48"
Stroke	24"
Cross travel of hydraulic ram	130"
Longitudinal travel of gantry	15'

	5323→
Capacity	75 tons
Bed, length and width	144" x 22"
Daylight	26"
Stroke	12"

For additional information regarding WILLIAMS-WHITE Production Machinery, write for BULLETIN 203.



REPRESENTATIVES

FRANK RYMAN'S SONS
Pittsburgh, Pa.

A. L. BECHTEL & SON
Cleveland, Ohio

IRVING R. GARD & CO.
Seattle, Wash.

WILLIAMS-WHITE & CO.
Chicago Office:
J. E. Maynard, Mgr.
53 W. Jackson Blvd.

ALLIED NORTHWEST MACHINE TOOL CORP.
Portland, Ore.

E. E. WOOD MACHINERY CO.
Detroit, Mich.

PAGEL MACHINERY COMPANY
Milwaukee, Wis.

SEIFREAT-ELSTAD MACHINERY CO.
Cincinnati, Columbus and Dayton, Ohio

EDWARD A. LYNCH MACHINERY CO.
Wynnewood, Philadelphia, Pa.

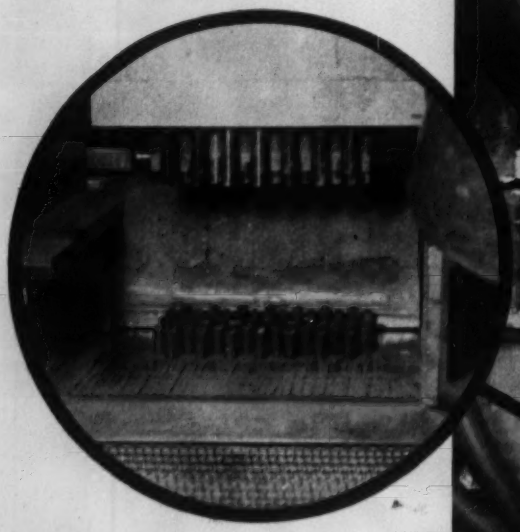
GEORGE A. DAVIES, Jr. MACHINERY CO.
Los Angeles, Calif.

BUILDERS OF MACHINERY SINCE 1854

WILLIAMS-WHITE & Co.

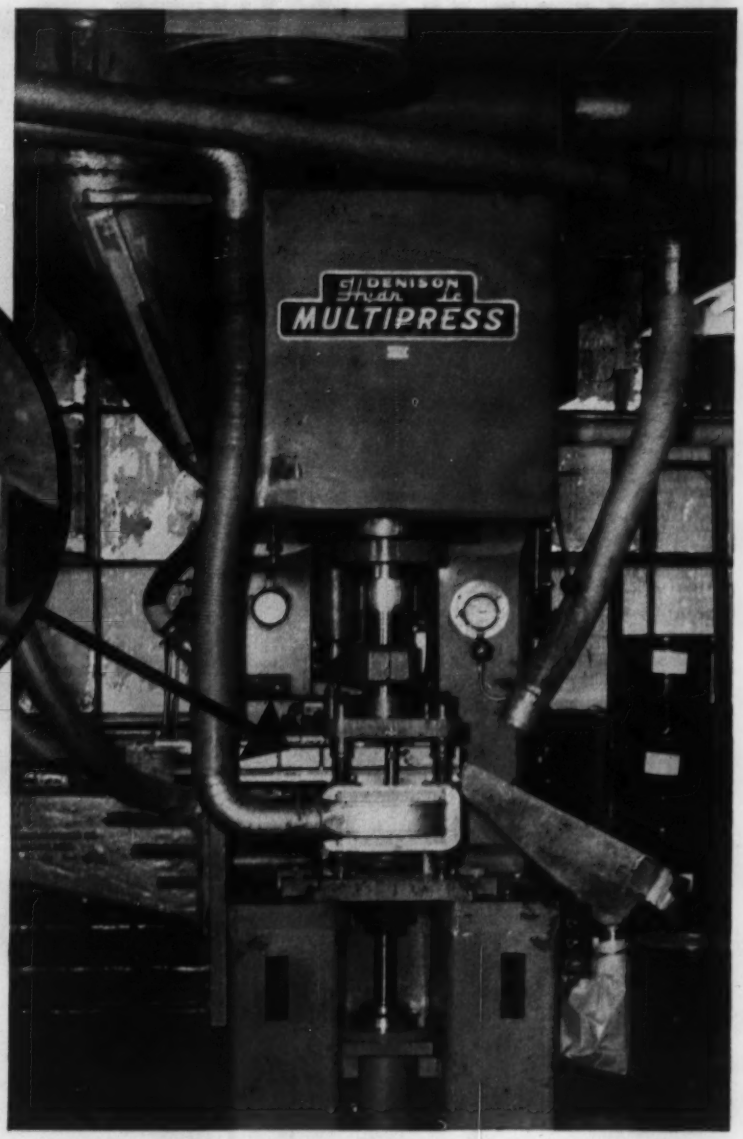
300 EIGHTH ST. • MOLINE, ILLINOIS • EST. 1854

Compacts 40,000 tablets an hour



...automatically with DENISON MULTIPRESS®

an idea that simplifies many compaction jobs ... to save you money



52 TABLETS PER CYCLE coming off multiple-cavity die after compaction on Denison hydraulic Multipress. Tablets come down chute, are collected and coated.

52 tablets compacted with every ram cycle add up to 40,000 tablets an hour. That's what's turned out on a Denison hydraulic Multipress at this leading pharmaceutical company.

The entire operation is automatic. Results are uniform, cost is low.

Hoppers feed powder to a Denison Shuttle Feed Accessory that loads a multiple-cavity die. Two rapid, precision pressure controlled strokes of the Multipress ram compact the powder into tablets.

Many operations of compacting powdered materials can now be done faster, simpler . . . at substantial reductions in cost with Denison hydraulic Multipress and accessory equipment. Have a Denison Engineer study your operations and demonstrate how. Write.

THE DENISON ENGINEERING COMPANY
1180 Dublin Road • Columbus 16, Ohio
A Subsidiary of American Brake Shoe Co.

DENISON Hydr**OIL**ics

HYDRAULIC PRESSES
PUMPS • MOTORS • CONTROLS

It's outstanding!

EVERY MANUFACTURER who tries Roebling high carbon flat spring steel discovers the same thing... that this spring steel is absolutely unexcelled for dimensional and mechanical uniformity... for speeding production and cutting down rejects.

You always *pay* for the best when you buy flat spring steel... make sure you *get* it by specifying Roebling. John A. Roebling's Sons Corporation, Trenton 2, N. J.

Empire State Building, world's tallest building.

ROEBLING

A subsidiary of The Colorado Fuel and Iron Corporation

BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5240 E. HARBOR ST. NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, TRENTON 2, N. J.

In soaking pits, Johns-Manville Sil-O-Cel C-22 Insulating Brick provide outstanding performance as back-up insulation.

Specify

Johns-Manville SIL-O-CEL C-22 Insulating Brick

the diatomaceous silica brick that retains its high cold crushing strength of 700 psi throughout normal service range

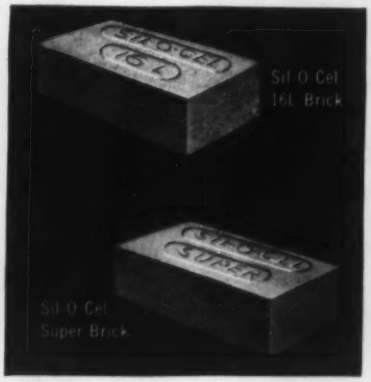
Because of its exceptional strength Sil-O-Cel C-22 Insulating Brick has gained wide acceptance as an all-purpose insulating brick. It is especially recommended for soaking pits, open hearth bottoms, slab heating furnaces, hot blast stoves, coke ovens and other high temperature equipment.

Millions of microscopic cells provide Sil-O-Cel C-22 brick with excellent heat resistance up to 2000F. It has a thermal conductivity of only 1.88 Btu in/sq ft/F/hr at 1000F mean temperature. In addition, with a density of 38 lb/cu ft, it is light and easy to handle.

For direct exposure or back-up to 1600F, use Sil-O-Cel 16L Insulating Brick. This newest member of the J-M diatomaceous silica insulating brick family has *less than 0.1% reversible thermal expansion at 1600F.* Conductivity is 1.07 Btu in/sq ft/F/hr at 1000F mean temperature with a density of 33-35 lb/cu ft. Cold crushing strength is 350 psi. Sil-O-Cel 16L serves equally well as back-up insulation or exposed refractory lining.

For back-up at higher temperatures, specify Sil-O-Cel® Super Insulating Brick with an unusually high temperature limit of 2500F.

Write today for further information on Sil-O-Cel Insulating Brick and Insulating Fire Brick. Ask for Brochure IN-115A. Address Johns-Manville, Box 60, New York 16, N. Y. In Canada, 565 Lakeshore Road East, Port Credit, Ontario.



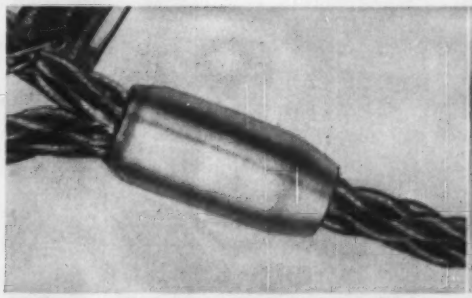
Johns-Manville *first-in* **INSULATION**

MATERIALS · ENGINEERING · APPLICATION

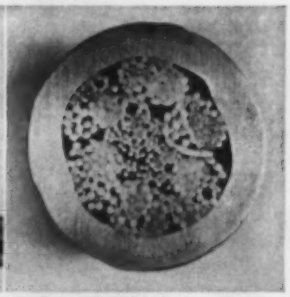
Tuffy® SLING NEWS

Vol. 1 Published Monthly in Leading American Trade Magazines by Union Wire Rope Corp. No. 1

DOUBLE GOOD NEWS ABOUT SLINGS



A heavy walled, streamlined steel ferrule is pressed on over tucked eye splice of Tuffy machine braided wire fabric from which sling is made.



Under exceedingly great pressure, the metal of the ferrule is flowed into fabric interstices.

Tuffy Makes Sling History Again With New Ferrule

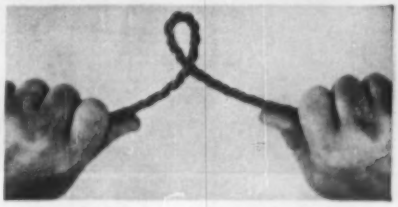
Tuffy Slings upset sling history quickly when introduced. The patented machine braided Tuffy Sling fabric has been upsetting sales and service records ever since.

Now, Tuffy Slings are making history again with a streamlined metal ferrule squeezed on over tucked eye splices so tightly that the eye splice has strength equal to that of the machine braided wire fabric. It makes Tuffy Slings stronger and safer. The ends of the tapered ferrule are swaged tightly to the fabric leaving no edges to hang up on loads or to injure workers' hands in hitching to and unhitching from loads. This, coupled with the great flexibility of Tuffy machine braided sling fabric, makes Tuffy Slings the handler's favorite.

High Strength of Famous Tuffy Machine Braided Flexible Wire Fabric Equalled in Eye Splice

Tuffy Slings' unusual resistance to kinking and the ease with which kinks are straightened out without damage to strands has piled up sling savings through longer service life.

Now, more advantages, bigger values are added to Tuffy Slings. Eye splices are made as strong as sling fabric with steel ferrule pressed on under great pressure over eye splice tucks. It's streamlined with ends tapered smoothly to fabric for safer, easier, faster hitching and unhitching on loads.



Your Tuffy Distributor Saves You Money!

Tell him what your future requirements might be. He'll keep a good stock for you to draw against. Call him soon. He's the man who can supply the biggest value in Tuffy Slings and Tuffy Hoist Lines to team up with your Tuffy Slings.

New Edition of Tuffy Sling Handbook FREE — Mail Coupon Now

This new 60-page Sling Handbook is a completely revised edition of the famous Tuffy book that first made sling news several years ago. The new edition shows you why Tuffy's new tuck splice and pressed-on ferrule can speed up sling-loading work, improve safety records. It contains complete information about a full line of factory-fitted Tuffy Slings, nearly a dozen new standard fittings available, and complete data and charts on all Tuffy Slings. It also has a brand new engineer's notebook and a valuable rigger's manual.

Get FREE Sling Handbook Mail Coupon Today

We just want you to see what a difference the new Tuffy ferrule and tucked splice make. We want you to have the advantages of this big, fully illustrated and charted sling guide. No obligation. Write now.

union Wire Rope corporation

Specialists in high carbon wire, wire rope, braided wire fabric, stress relieved wire and strand.

2160 Manchester Avenue, Kansas City 26, Missouri

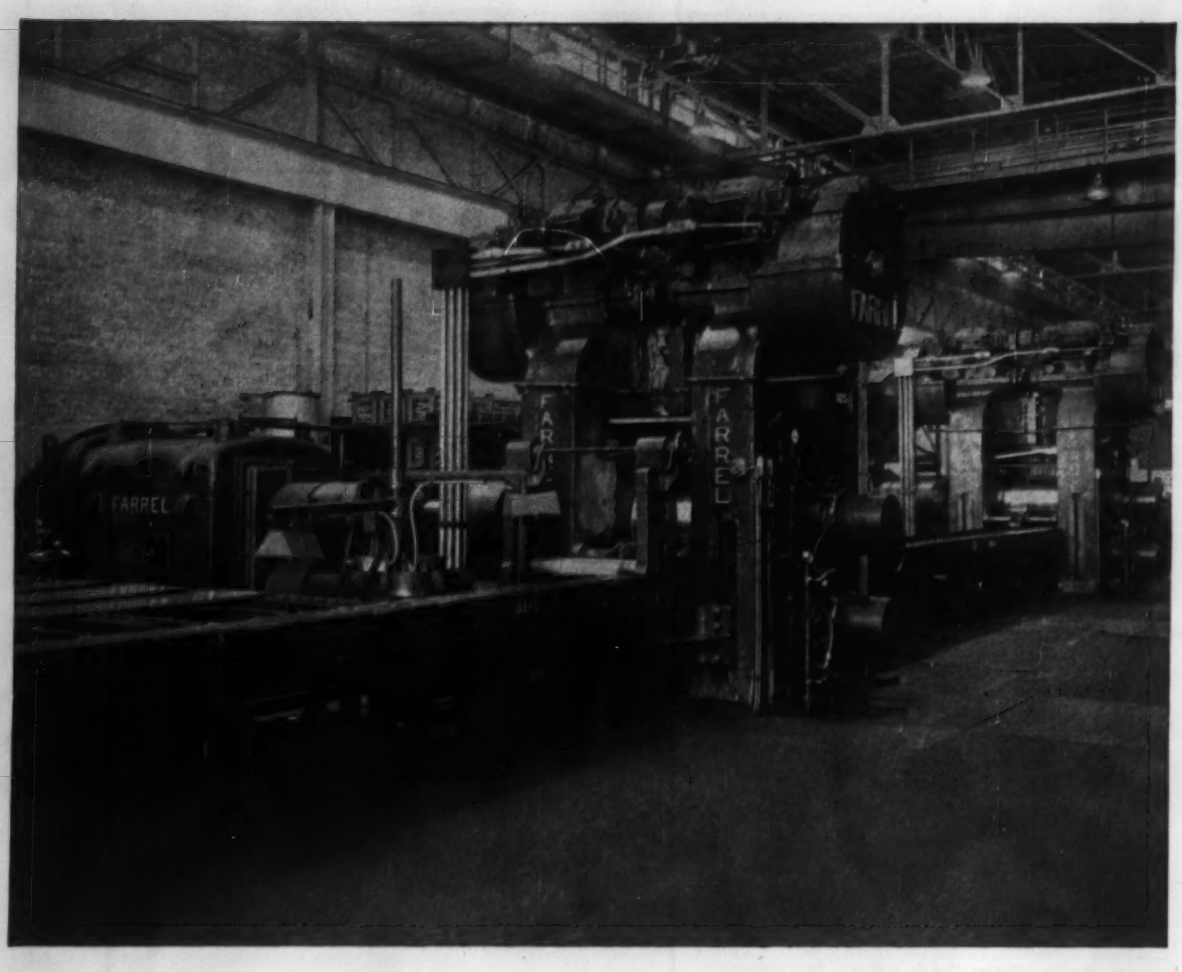
MY NAME _____ TITLE _____

COMPANY NAME _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

12



Add years to your gears . . .

ENCLOSED reduction gears and their bearings stay in service longer, run smoother, require less maintenance expense when you use *Texaco Meropa Lubricant.*

Texaco Meropa Lubricant is refined from the choicest base stocks, and further improved by highly effective and long-lasting EP agents. *Meropa* keeps gears operating dependably, even under shock loads and extra-heavy steady loads.

Other outstanding characteristics of *Texaco Meropa Lubricant* are its resistance to thickening at high operating temperatures, and its high oxidation resistance. In addition, *Texaco Meropa Lubricant* will not foam, is non-corrosive to bearing metals, and remains stable in use, centrifuging or storage.

You can assure highest efficiency at lowest cost by employing effective Texaco Lubrication. Let a Texaco Lubrication Engineer help you select the proper lubricants for your operation. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO

TEXACO Meropa Lubricants

FOR STEEL MILL GEAR DRIVES

TUNE IN . . . TEXACO STAR THEATER starring JIMMY DURANTE on television . . . Saturday nights, NBC.

STEEL

November 28, 1955

Metalworking Outlook

Steel Expansion

U.S. Steel Corp. says reports that it will spend $500 million on expansion in 1956 are "unconfirmed rumors." It has nothing to announce now. Here's the score on current steel plans thus far announced: Republic, 1,618,000 tons; Armco, 1,176,000 tons; National, 1 million tons; Inland, 800,000 tons; J & L, 700,000 tons; Granite City, 360,000 tons; Wheeling, 270,000 tons; Pittsburgh, 211,000 tons; C F & I, 160,000 tons; Northeastern Steel Corp., 112,000 tons; Copperweld Steel Co., 42,000 tons; Roanoke Electric Steel Co., 25,000 tons, Eastern Stainless Steel Corp., 18,000 tons. Total: 6.5 million tons.

Merger Stalemate

Bethlehem Steel Corp. and Youngstown Sheet & Tube Co. are willing to face a court to test their merger plans, provided it's no donnybrook like the Du Pont affair. The companies have been able to receive no assurances of speedy action by the government; that's why they have taken no legal steps toward the marriage. Attorney General Herbert Brownell says prompt federal action will come if and when Bethlehem and Youngstown move.

Growing Market

Among the many growing steel markets over the next two decades will be the oil and gas industries. Austin Cadle, economist for Standard Oil Co. of California, says their demands for steel by 1975 will hit 12 million tons annually. They consumed about 5 million tons in 1954. Much of the increased needs will come from higher well drilling requirements. In 1955 oil and gas industries probably will drill some 55,000 wells in the U.S. By 1975, that will jump to about 81,000.

Unique Hearings

Keep your eye on an important congressional investigation, to start Dec. 5. Rep. Wilbur Mills (Dem., Ark.) heads the Tax Policy Subcommittee of the Congressional Joint Economic Committee that will hold a two-week hearing. Subject: What taxes do to the economy. The hearings—and a 930-page book incorporating ideas of 84 top economists prepared for the affair—are unique: They will attempt to come up with a long-range evaluation of the impact of taxes.

CIO Turns to Illinois

Watch Illinois. The CIO is seeking approval there for integration of public unemployment compensation with the auto companies' Supplemental Unemployment Pay. If an O.K. comes, there's little doubt that the SUP plans negotiated with Ford and General Motors will go into effect as scheduled next June 1. Required is approval of integration by states with two-thirds of each company's employment. Ohio turned down integration in

Technical Outlook—p. 97 Market Outlook—p. 135

the Nov. 8 elections, but New Jersey's attorney general approved it a few days later. Other precedents favoring integration have been set in Michigan, New York, Connecticut, Delaware and Massachusetts.

Tool Orders Jump

Machine tool orders in October were the highest for any month since July, 1952. October's new orders, reported by the National Machine Tool Builders' Association, totaled $103.4 million, compared with $61.3 million in September, $65.5 million in August and $64.4 million in July. The industry continues to ship at the rate of $60.6 million a month. Shipments for the first ten months totaled $536,950,000, compared with $778.5 million in the same 1954 period.

More Big Presses?

The Air Force may revive part of the canceled portion of the heavy press program. In the first year of the Eisenhower administration, four forging presses and three extrusion units were dropped because of economy. Some of the extrusion presses may be reinstated—at least a 20,000-ton unit planned for Aluminum Co. of America's Lafayette, Ind., plant where foundations have been partially completed. Reason: The extrusion jobs already built are proving an economic success and have more work than they can handle.

Inflation and Defense

Defense spending is likely to increase in fiscal 1957—because of inflation, not because physical volume will rise. Defense Secretary Charles E. Wilson suggests that the defense budget request should be set in relation to the gross national product. He predicts that about the same percentage of the total budget will go for military hardware as was allowed in fiscal 1956.

Prices Up 15 Per Cent?

Manufacturers' prices will rise a minimum of 15 per cent over the coming seven months, predicts Eliot Janeway, consulting economist. The pressure will come from rising costs of commodities and higher labor wages. He thinks iron and steel scrap will climb to $60 from the present average of $46.33.

Straws in the Wind

The Supreme Court opened this session with 39 labor cases on the docket, compared with 30 the year before . . . French companies will probably supply most of $3.5 million in capital goods for a blooming mill and reversible mill for Acesita, Brazilian manufacturer of special steels . . . The Defense Minerals Exploration Administration approved 17 new exploration projects in October; it continues to receive applications for financial aid at the rate of 40 or more a month.

Plating development works big changes in metal finishing

♦ Companies plating products with chromium are switching to an advanced process developed by United Chromium . . .

♦ Benefits achieved include fast production, increases in capacity of existing equipment, savings in power, better finishing . . .

Things changed abruptly a few short years ago for companies finishing products with chromium when the Unichrome SRHS Chromium Plating Solution was introduced. It gave users a more efficient, more easily controlled and faster process . . . resulting in better finishing and substantial savings. Here are some recent reports from the field:

EFFICIENCY UP . . . POWER BILLS DOWN

A 60% reduction in power costs was achieved by SRHS when it was installed by one of the country's leading manufacturers of electrical appliances. A 50% slash in power need was made in another plant.

SAME EQUIPMENT . . . 66% MORE CAPACITY

Existing equipment gained 66% additional capacity when SRHS replaced the ordinary solution in the plant of a prominent automotive manufacturer. The change avoided need for costly overtime or extra equipment to increase output.

And on top of such cost reductions, there are also better results with SRHS Solutions. Users get fewer rejects, better color, better coverage of intricate parts, more uniform plates.

This is just one of many United Chromium developments in processes, equipment and materials which provide opportunities to cut your finishing costs . . . opportunities to turn out a better product through a better finish. We'd welcome the chance to work with you.

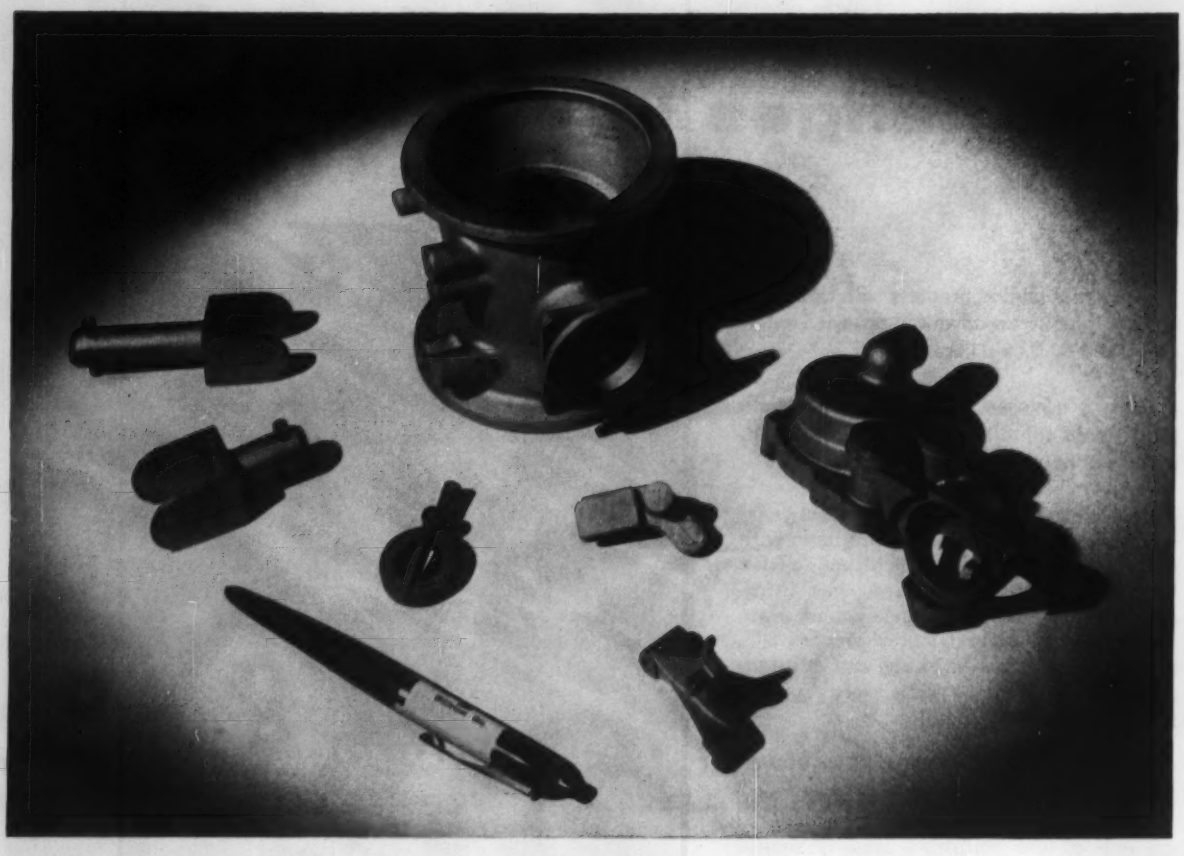
UNICHROME Trade Mark

METALLIC and ORGANIC FINISHES . . . EQUIPMENT

UNITED CHROMIUM DIVISION

METAL & THERMIT CORPORATION

100 East 42nd Street, New York 17, N. Y.
Detroit 20, Mich. • Waterbury 20, Conn.
Chicago 4, Ill. • Los Angeles 13, Calif.
In Canada: United Chromium Limited, Toronto 1, Ont.



Stainless castings show up to 190,000 psi strength after 875 F hardening treatment

Foundries report ultimate tensile strength as high as 190,000 psi in investment castings of Armco 17-4 PH Stainless Steel. This precipitation-hardening grade is easy to cast. It fills thin sections and details nicely, surface finish is good and tolerances small.

READILY MACHINABLE Armco 17-4 PH investment castings machine readily to an excellent surface finish. The subsequent 1-hour hardening treatment at 875 degrees F will not distort the part nor damage the surface. It causes only a slight discoloration.

NUMEROUS SUPPLIERS Armco does not make castings. If you are interested in high-strength, low-temperature hardening castings with high corrosion resistance, just fill out the coupon. We'll send you a list of suppliers of investment castings and other types made of Armco 17-4 PH Stainless Steel.

Armco Steel Corporation 1345 Curtis Street, Middletown, Ohio
Send me a list of producers of castings of Armco 17-4 PH Stainless Steel.

Name:_____

Firm:_____

Street:_____

City:_____ Zone:_____ State:_____

ARMCO STEEL CORPORATION 1345 CURTIS STREET, MIDDLETOWN, OHIO

SPECIAL STEELS

SHEFFIELD STEEL DIVISION • ARMCO DRAINAGE & METAL PRODUCTS, INC. • ARMCO INTERNATIONAL CORPORATION

Restyling the Economy

Keep your eye on the fast-stepping, fast-changing automobile industry. The future of your business could be at stake.

Production of passenger cars in 1955 will be a shade under 8-million units, a new record. Current predictions peg 1956 production at 7-million units. This thinking is shaped by four considerations: The suspicion that the market is momentarily saturated, restrictions on credit, charges from dealers that they are being high pressured and the feeling that potential buyers will pass up 1956 facelifts for all-new 1957s.

But suppose the economy continues to bowl along at a $400-billion clip in 1956; that General Motors and Ford decide to introduce their 1957 lines earlier to meet the competition of Chrysler's more-than-facelifted editions now on the market. As in 1955, auto sales departments in 1956 conceivably could be surprised with another 8-million-car year.

There is evidence of agreement with Chrysler's president, L. L. Colbert, that an 8-million year is no temporary thing: The auto industry is laying out $1.8 billion for new plants and equipment in 1956. Billions more will be spent in the next five years.

These fantastic expenditures will be accompanied by far-reaching changes —and this is where your business, even your job, come into the picture.

As in aviation, the piston engine eventually will be replaced by the gas turbine. Think of the chain reaction that will start! Body and frame construction will give way to single-unit bodies. Transmissions will be subjected to further change and refinement. The small auto dealer, like the corner grocery, may disappear in favor of the auto supermarket in the drive to cut costs.

In this period of accelerated expansion and change, the old will be swept aside for the new. Many a battle for markets in materials, parts and equipment will be lost as well as won.

The important thing is not to get caught by surprise. The auto industry will restyle our economy.

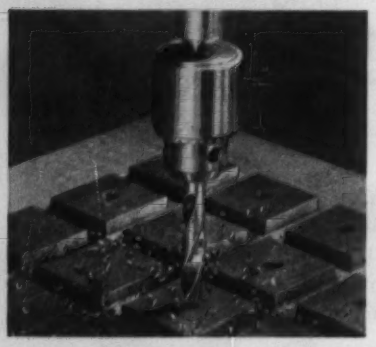
Irwin H. Such
EDITOR

(Advertisement)

WHAT'S NEW
IN STEEL FROM STOCK

Now—Leaded Plates

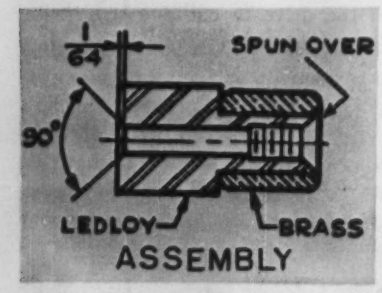
First stocks of leaded steel plates available anywhere are now on hand at Ryerson—and users are reporting results as remarkable as those achieved by thousands of companies with leaded steel bars. Tests show that New E-Z-Cut leaded plates cut faster, take a sounder weld, and polish to a high finish more readily than non-leaded



E-Z-Cut plates. And because sulphur content is much lower New E-Z-Cut is a much cleaner steel, free from troublesome sulphide stringers. First stocks include thicknesses up through 3".

Leaded Bars Make News

Ledloy from Ryerson attracted a good deal of attention at the Chicago Machine Tool Show this fall when three leading machine tool manufacturers chose this amazingly fast-cutting leaded bar steel to demonstrate the efficiency of their latest equipment. For example, the part shown here was machined from Ledloy and assembled with its brass ferrule at a rate of 200 per hour by one tool builder. And at the A.S.M. Show in Philadelphia machining demonstrations showed that the new Ryerson leaded alloy steel Rycut 40 in-



creases tool life up to 300% over non-leaded alloys in the same carbon range. For more details about these demonstrations, and for many other case studies, call Ryerson—where the nation's largest stocks of leaded carbon and alloy steels are available for immediate shipment.

New Fluid Power Tubing

Another development highlighted at the Machine Tool Show is the tremendous increase in hydraulic power applications. And because of this increase, the new Ryerson stocks of light-wall, pump-cylinder finish cold-drawn WELDED tubing should be of interest to a widening group. The special smooth I.D. of this welded tubing often makes it suitable for use "as-is" in place of more expensive types of tubing which still require extra finishing operations. Also in Ryerson stocks for hydraulic applications: Rockrite cylinder finish tubing and hydraulic fluid line tubing.

New Look for Steel Walls

Give steel-walled buildings new beauty with stainless steel siding in mansard pattern, now available for quick shipment from Ryerson. (Galvanized and carbon steel sheets are also available in mansard pattern.) Unusually attractive, economical in total area lost from pattern formation, maintenance-free stainless in mansard pattern also has many industrial and miscellaneous architectural ornamental applications. For new bulletin 70-5, write Ryerson, Box 8000-A, Chicago 80.

Aircraft Steels Specs

Just off the press, a new booklet entitled "Aircraft Steels" contains latest information, in condensed form, on Aeronautical Specifications—Military (MIL), Air Force-Navy (AN), Federal (QQ-S) and AMS aircraft quality steels. Also included is a complete listing of aircraft quality alloy and stainless steels available for quick shipment from Ryerson. To get your copy write Ryerson, Box 8000-A, Chicago 80, for booklet 93.

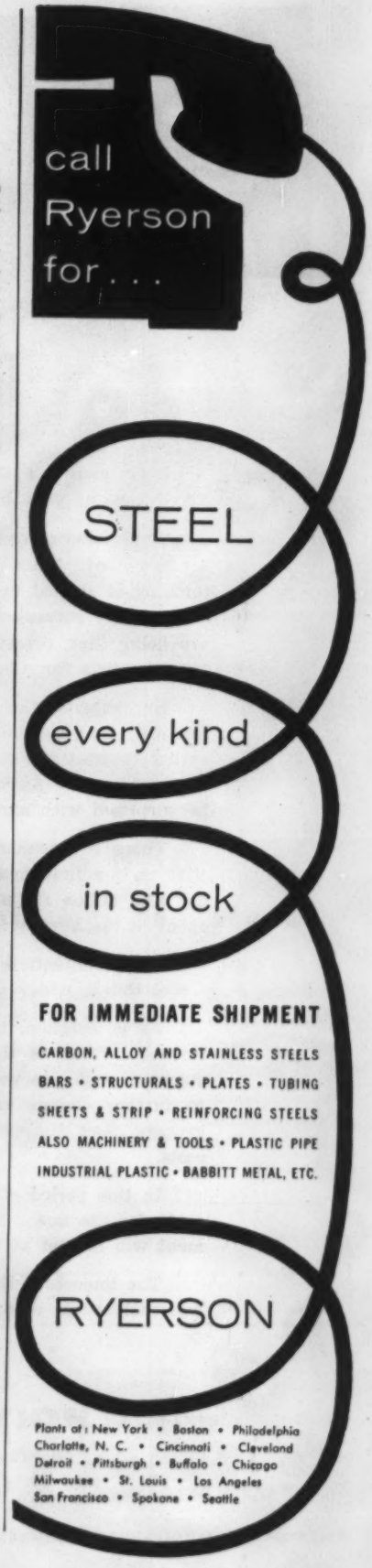
Biggest Stainless Plates

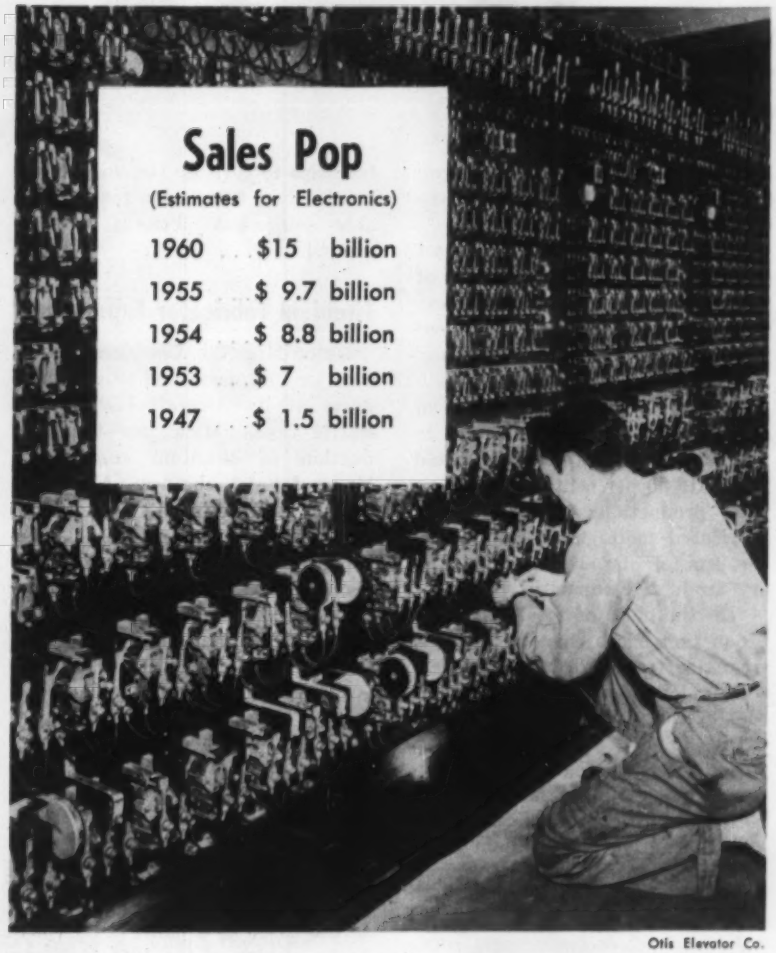
Now available from Ryerson stocks: 96" wide plates in thicknesses up through 1", and heavier plates in 80" widths. Types on hand: 304, 304L, 316, 316L. Save welding on next big job with these larger plates.

Carbon Bars, Plates, Shapes

Heavy demand is keeping supply out of balance from a size standpoint. However, we have thousands of tons of steel on hand and new tonnage being received daily. Ryerson stocks remain the world's largest and most diversified.

Joseph T. Ryerson & Son, Inc.


call
Ryerson
for . . .
STEEL
every kind
in stock
FOR IMMEDIATE SHIPMENT
CARBON, ALLOY AND STAINLESS STEELS
BARS • STRUCTURALS • PLATES • TUBING
SHEETS & STRIP • REINFORCING STEELS
ALSO MACHINERY & TOOLS • PLASTIC PIPE
INDUSTRIAL PLASTIC • BABBITT METAL, ETC.
RYERSON
Plants at: New York • Boston • Philadelphia
Charlotte, N. C. • Cincinnati • Cleveland
Detroit • Pittsburgh • Buffalo • Chicago
Milwaukee • St. Louis • Los Angeles
San Francisco • Spokane • Seattle



Otis Elevator Co.

Diversification, financing and market research cause . . .

Growth Pains in Electronics

"ELECTRONIC applications are becoming as universal as steel itself—and as unaffected by industrial boundaries as the electric light bulb," says William G. Laffer, president, Clevite Corp.

Caution—This Cinderella industry, anticipating sales of $9.7 billion this year (see table), is still going through some growing pains. Two major problems: 1. Lack of capital. 2. Inadequate market research.

Case History: Consolidated Electrodynamics Corp. (formerly Consolidated Engineering Corp.) has spent some $11 million on expansions and modernizations during the last ten years. Its earnings were about $3.5 million. After paying stockholders and digging up an extra $1 million through depreciation reserves, the company still had $8 million to go. Phillip Fogg, president, reminisces: "I can remember the day, not so many years ago, when I practically crawled on my hands and knees to the bank to borrow another $5000." This is in the past for Consolidated, but many small electronic companies are in the same straits today.

Lesson Learned — The importance of "sell products" is also being realized. Color television has been a rude awakening to many manufacturers. It did not provide a new service—only an added dimension. Few people have been willing to pay the high premium for a color set. On the other hand, as the price can be reduced a ready market is available, say market research surveys. W. R. Baker, vice president, General Electric Co., explains: "There are products in the process of creation which may never become commercial realities because they will cost more than the public can afford."

Soup to Nuts — One definition for electronics: Any device which passes current from a plate to a cathode through a vacuum or gaseous medium. Devices which replace a strictly electronic device (transistors, etc.) are also part of the electronics field. It breaks down in terms of sales into three fields: Communications (radio, television, etc.); industrial (voltage regulators, variable speed devices, etc.); and military (guided missiles, gyros, etc.).

Current military procurement for electronic equipment runs about 6.3 per cent of the total defense spending. Estimates by industry leaders indicate that this will increase to at least 10 per cent by 1965.

Sales Returns—Hewlitt-Packard Co. reports that first half sales for this year jumped 13 per cent over the first half of 1954. Sales outlook for the rest of this year is for a 30 per cent increase over the last half of 1954. "But," explain company officials, "even though the industry is expanding, competition is beginning to be felt and the electronic customer is continually getting more for his dollar."

Most electronic companies are toying with peak years. Motorola Inc. reports that sales during the first half were up 20 per cent over the corresponding period last year. Sylvania Electric Products Inc.

registered a $5-million gain in sales during the first half of this year over the first half of 1954 and explains that the rest of the year should be "excellent."

Point of Interest—Diversification is still the key to success, but some companies are finding that one product could be its bread and butter. Raytheon Mfg. Co. has a widely diversified line of electronic products, but is also placing an increased emphasis on transistors. It is moving into additional plant space which will enable it to triple the present capacity for transistors and other semiconductor devices used in hearing aids, radios, computers, guided missiles, etc.

Diversification is also causing some confusion. Douglas C. Lynch, president, Brush Electronics Co., points out: "The industry pattern is changing so fast that it is difficult to stay current on who is doing what. As the industry's volume expands, it becomes more and more costly to change product emphasis or break into a new part of the field. Because of this, everyone is trying to get on the right horses as soon as possible."

Future — Electronics will not only serve the military and civilian markets in the future, but may well serve the housewife. Possibilities include electronic refrigerators, dish washers, laundries and dust eliminators. Electronics could also be used used to tie together radio-frequency cooking. Air conditioners may be built without motors, compressors or blowers—but with controls which will make it possible to separate humidity from cooling.

Designers say that some of these things could be made now, but the electronic industry is being careful. Reason: There is no need to create new goods or services unless the products can be turned into thousands of sales.

Metal Product Firm Expands

Miller Metal Products Inc., Baltimore, is erecting a 10,000-sq-ft addition to its plant, raising the total to 90,000 sq ft. The added space will be used to produce a new type metal kitchen cabinet. M. M. Miller is president and general manager.

Defense Against A-Bombing

Dispersion of industry is basic to maintaining output in atomic war. But, say Armour scientists, individual plants can take some defensive steps

FIVE atomic bombs could destroy 60 per cent of our electronic instrument capacity.

That's the unnerving prospect tendered by Dr. Robert L. Janes of the Armour Research Foundation, Chicago. Speaking before a recent A-Bomb and industry conference, he declared:

Vulnerable—"The destruction of ten metropolitan areas, selected to maximize industrial damage, could eliminate 50 per cent of our petroleum production, 46 per cent of fabricated metal products and 55 per cent of our electrical machinery productive capacity.

"On the basis of total industrial production, more than 30 per cent emanates from five industrial centers, which house more than 20 per cent of the population."

Dispersion of industry, says Dr. Janes, is basic. Meanwhile, he suggests, plans should be made for both alternative production sources and alternative management.

Getting the Answers—Dr. E. H. Schulz, Armour's assistant director, says industry needs answers for these questions: What are the pressure, radiation and thermal effects of the bomb? What should be done to protect critical structures and equipment? Dr. Schulz calls for declassification of the first question, better information on the second.

The nation has only a "handful" of blast-effect scientists, he points out. Rather than waste their efforts on individual companies, he suggests they should select one plant to be used as a model within every target industry. With a little tailoring, individual companies could apply results at much lower cost.

Suggestions—Raymond S. Sauer, supervisor of Armour's structural analysis section, adds that for the individual plant, the first consideration is to determine whether it is likely to be in a target area. From there, management can study plant operations, construction and facilities to turn up the vulnarable points. One suggestion for vulnerable equipment: Take it underground.

Titanium Fabricator Expanding

Eaton Mfg. Co., Cleveland, plans a major equipment and tooling program at its Aircraft Division in Battle Creek, Mich., for the production of titanium compressor blades for jet engines. About $8 million will be spent for capital equipment and new tools. The program includes an increase of about 10 per cent in floor space. Titanium blades will be produced by Eaton's roll forging process.

The firm's Valve Division has spent over $2.5 million on new facilities and equipment in the last three years and is contemplating further sizable capital expenditures in the next three years.

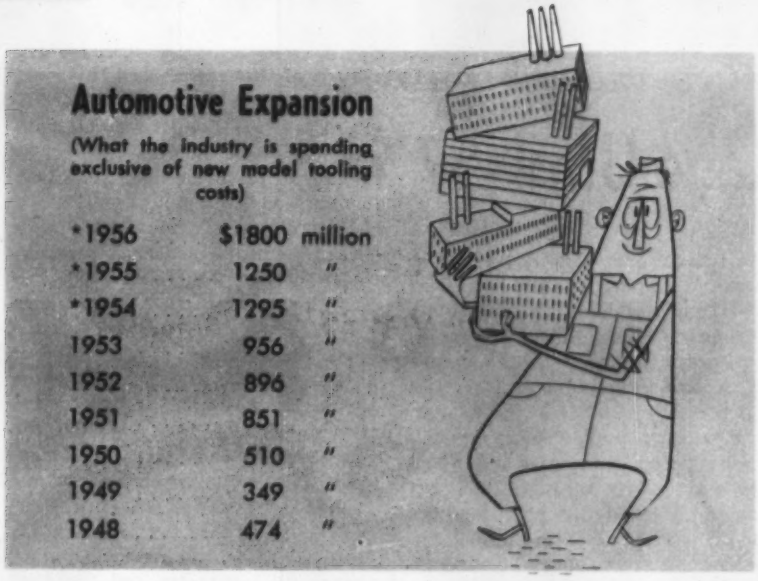
Panel Discusses Mergers

Facets of industrial mergers will be discussed by a panel at an open-house session of the 1955 Institute for Small Manufacturers at the University of Pittsburgh on Nov. 29. Viewpoints of an editor, lawyer and industrialist will be given.

On the panel will be William M. Rooney, market editor, STEEL; Ralph Demmler, attorney and former administrator of the Securities & Exchange Commission; and A. C. Daugherty, manager of market research, Rockwell Mfg. Co., Pittsburgh, and vice president, Pittsburgh chapter, American Marketing Association.

Fastener Manufacturers Merge

Pheoll Mfg. Co., Chicago, maker of screws, nuts, bolts and special fasteners, purchased Voi-Shan Mfg. Co. Inc., Culver City, Calif. Voi-Shan makes precision fasteners for the aircraft industry and will be operated as a subsidiary.



Autos: Growing Like '60

IN 1929, the best prewar auto production year, 4.4 million passenger cars were manufactured. As recently as 1948, two years after the end of the war, only 3.9 million were produced.

Look at 1955. Production is already past the 7 million mark (an all-time record) and is headed for close to 8 million by year end. There are many in the industry who figure 10 million passenger cars could be turned out if the pressure were really on.

Good Growth?—The question is raised: When does growth get out of hand? In the face of the unprecedented production and productive capacity, automakers continue to pour forth a steadily increasing stream of modernization and expansion projects. Automakers are not merely continuing to expand. They are increasing their rate of expansion.

Take Chrysler Corp., for example. In the ten years from Jan. 1, 1946, to Jan. 1, 1956, it will have spent about $750 million for the expansion and modernization of facilities. But Chrysler's President L. L. Colbert announces $1 billion will be spent *not* in the next ten years, which would be a one-third increase, but in the next five —more than double the existing rate.

Cases — Similarly, Ford Motor Co., which has spent $1.65 billion during approximately the same period, will increase its rate of expansion and modernization. Already announced is a program to spend $1 billion during the next three years, half in 1956 and the remainder in 1957-58. Some observers expect that when 1959 rolls around that Ford will have bettered its figures of the last ten years by a considerable margin. And that's independent of another $1 billion committed for new tooling, which means that by the end of 1957, Ford will have spent or committed more than $3.75 billion since 1946 on new tools and new, expanded and modernized manufacturing and assembly facilities.

Then there's General Motors Corp., producer of about half the nation's passenger cars annually. It has spent about $4 billion for expansion and modernization. GM spokesmen aren't talking about forward planning but it's safe to assume Harlow H. Curtice, GM president, will announce a representative expansion figure in January.

Also High — American Motors Corp., scoring Nash and Hudson separately prior to the merger, has invested more than $175 million in facilities development since the war. Studebaker - Packard has chalked up $100 million in three years under James J. Nance leadership.

Too Conservative — Ernest R. Breech, chairman of the board at Ford, says Ford made a "whopping big bet on the future" because of its belief that "a great many people, including businessmen, may have failed to gage accurately the tremendous changes that have been taking place in our American economy, and are underestimating the potential that lies ahead of us."

He reports that the dream "we have all been anticipating for the early 1960s is no longer a distant dream," and that "we have no choice but to prepare for a major breakthrough onto a new and much higher plateau of production and consumption."

Three Cars—Mr. Colbert says: In 1975 the one-car family will be in the minority. In fact, a large number of families will be using three or more cars. He notes that 14 million families still do not own an automobile, and that two out of every three women have not learned to drive. Close to 6 million cars on the road were built before World War II. In the years ahead, Mr. Colbert estimates 4 to 5 million must be built just to replace those that are being scrapped.

With those factors in view, he does not see the 8-million-car year of 1955 as "a temporary phenomenon."

Where—Where will the money go? Into just about every facet of auto production. New assembly plants and improvement of existing facilities, more and improved engine plants, new and revised body facilities, more plants to make transmissions and, of course, office and research facilities.

Much equipment will be automatic. Mr. Colbert views this as "a timely blessing indeed." While population will increase by 20 per cent in the next ten years, the available work force will increase only 6 per cent.

Aluminum use may more than double by 1960, so . . .

Aluminum Shortage Until '57

LOOK FOR aluminum to be tight through 1956, maybe into 1957. That's the picture painted by top officials of the four big producers (Alcoa, Reynolds, Kaiser and Alcan).

Stockpile calls will be the big key to just how hard to get the metal will be, the executives told Aluminum Extruders Council. Stockpile shipments for the first half of next year already have been deferred by Defense Mobilizer Arthur S. Flemming.

Stockpile Key—"But," says Don Wilmot, vice president, Aluminum Co. of America, "indications are that stockpile requirements have not been realized. We hope they will be deferred for the remainder of next year, but I wouldn't try to predict what will happen."

In addition to its effect on supply, the stockpile has been a deterrent to expansion, points out David P. Reynolds, vice president, Reynolds Metals Co. It worries potential lenders.

Possibility—Conceivably, aluminum supply could be tight well beyond next year. The industry may have fluctuations (of looseness and tightness similar to 1954-55) through 1960, states D. C. Rhoades, vice president and general manager of Kaiser Aluminum & Chemical Corp.

Producers have been figuring that supply will increase about 11.6 per cent yearly through 1960. Between 1954 and this year, use was up 25 per cent. If the annual increase (in consumption) continues at more than the 11.6 per cent, supply will be tight all the way to 1960, in the opinion of Charles R. Nash, vice president, Aluminium Ltd. Sales Inc. As long as use follows the 11.6-per-cent increase, he sees a fairly close balance in supply and demand if there are no stockpile calls.

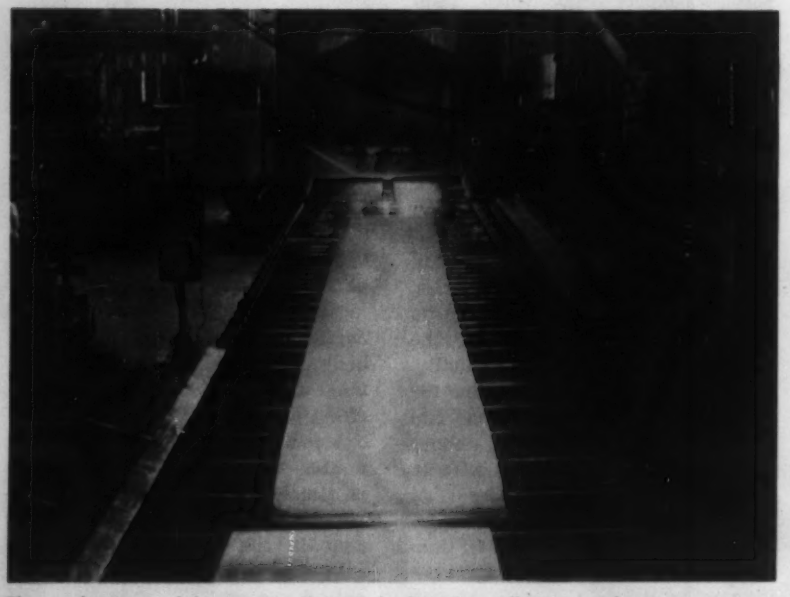
Consumption Up—As things are figured now, about 6 billion lb of aluminum will be used in 1960 (including military, but not stockpile needs). That's one and one-half times present volume. Domestic primary aluminum production will account for about two-thirds of that metal used this year (remainder is scrap and imports). Proposed new facilities coming into production through 1960 will enable primary to hold that percentage of the supply.

Nonintegrated aluminum users are promised a share of that expansion. But they're still liable to be pinched for metal, especially those which are growing faster than the average.

What's going to happen when fast tax write-off contracts between primary producers and the government run out? Contracts now require shipment to nonintegrated users of two-thirds of output from fast tax write-off facilities. Over the next couple of years the contracts call for that amount to be cut back to 25 per cent for the next 15 years. Producers say it won't make any difference in the amount of metal available to independent users; more is being shipped now than the two-thirds the contracts require.

Hunt for Markets — Producers see plenty of room for continued growth. And in spite of the tightness of supply, they're keeping up the search for additional uses and markets. Rapid growth is forecast for sheets, extrusions (see opposite page), rod, bar and wire, diecasting and permanent mold casting.

Most favorable industries for further big gains are building and construction, autos, canning and packaging, electrical, farm irrigation and oil. The big invasion of aluminum into the auto industry is looked for in 1957 and 1958 models.



These aluminum slabs are on Kaiser's hotline for rolling into sheet

Kennametal Buys Almond Mfg.

Kennametal Inc., Latrobe, Pa., purchased T. R. Almond Mfg. Co., Willoughby, O., primarily to provide additional facilities for the manufacture of mechanically held types of metal-cutting tools. The Ohio plant is being equipped for the new manufacturing operations. Mark A. Rollinson is manager of the new plant.

Kennametal makes cemented hard carbide compositions, tools and wear-resistant component parts for machines and processing equipment.

Harvey Machine Co. Inc.

Skyrocketing aluminum consumption may mean . . .

Extruders Feel Metal Pinch

ALUMINUM EXTRUSIONS are going places. Nonintegrated extruders will do about a $250-million business this year, and figure to grow about 20 per cent a year for the next five—if they can get enough metal (see opposite page).

Says Philip Lemelman, executive secretary, Aluminum Extruders Council: The industry will use 600 million lb of aluminum in 1955, compared with 100 million in 1949. Use may hit 1.35 billion lb by 1960.

Big User — Independent producers have taken about 20 to 25 per cent of primary aluminum production for the last several years.

Most independent extruders — there are about 100 of them, compared with about 6 ten years ago—got into the business to supply extrusions for their own end products, says Jack Doering of J. S. Thorne Co., Philadelphia. Now many also produce extrusions for sale.

Squeeze—Big uses of extrusions are in building trim, windows and doors, truck trailers and TV antennas. Opportunities for expansion are great in autos and furniture.

Extruders agree that business is fine as far as finding customers goes. Then comes the squeeze—they can't get enough metal. The situation might be even tighter, but window and door makers—big users—are fighting a glass shortage as well, which cuts down on their intake of metal.

Shut Down—"We aren't starving to death," says one executive, "but we all could use more metal than we're getting." Another adds: "Sales are no problem, but I've had to shut down one of my three presses."

In best shape are extruders that have been in business for some time.

Scrap Tight—With the price of aluminum scrap higher than the cost of primary metal billets and a conversion cost of 3 to 5½-cents a pound added in, it makes the going rough at times for firms that have to depend on secondary metal to keep operating. Also, clean scrap is almost as hard to find as primary metal.

Youngstown is one of few areas in the country where large amounts of aluminum scrap are generated. So times are busy for firms like Superior Industries Inc. About 2 million lb of scrap per month are converted there. The company uses about 20 per cent of that in its own presses, sells the rest, says S. J. Henry, president.

Sidelines—Extruders are never just sure where new business is going to pop up. "Our main business is television antennas," says Harry Resnick, president, Channel Master Corp., Ellenville, N. Y. "But we're supplying increasing amounts of drawn aluminum tubing to the furniture industry." It's estimated that the television antenna industry takes about 16 million lb of aluminum annually, about half of which ends up in the furniture business.

In Boston, Trim Alloys Inc. does most of its business in interior building trim, but is finding a growing sideline in producing dies for other extruders, says M. J. Smith, president.

Likely to add additional pinch to aluminum supply are the numbers of new extrusion presses being ordered. About 60 will be installed this year. Press builders estimate another 60 will be put in next year.

Somewhat of a mystery to other extruders—and perhaps even to the press buyers themselves: "Where is the metal to operate them going to come from?"

Lindberg draw furnace anneals torsion bars at National Acme Co., Cleveland

Savings in Heating

WHY BUY a new Whizzer V-8 when it costs the same amount of dough to get the old Clunker 6 repaired?

Silly question? Yes—whether you are talking about the family jalopy or your firm's industrial furnaces. But that doesn't mean it isn't being done.

For Example — The Industrial Heating Equipment Association Inc., Washington, says one of its members overhauled two protective atmosphere generators over 30 years old. Two new generators (and improved performance) could have been bought for what it cost to have the oldsters repaired.

Why repair? The men negotiating the deal explained that their company had money in the budget for maintenance but none for capital expenditures.

Obsolescence—A conservative estimate places the amount of obsolete heating equipment in use at 35 per cent. The result is waste —unnecessary grinding, machining and descaling.

The association says any industrial furnace more than 20 years old must be considered obsolete.

Sales—A lot of industry agrees and is buying—orders of industrial heating equipment through October were nearly $71 million, compared with $46.3 million for all of last year. In 1953, sales were almost $68 million; in 1952, nearly $76 million.

Induction heating orders continue at a driving pace. September's orders were $1.1 million. Orders for the year are about 170 per cent of last year's.

Case Histories—Behind the rise in equipment sales are savings in time and money. When Ingersoll Milling Machine Co., Rockford, Ill., replaced three batch-type, high-speed furnaces with one pusher-type atmosphere furnace, it boosted production 53 per cent and cut grinding time in half.

By heat treating high-speed cutter blades in the controlled atmosphere furnace, scale was eliminated, and the blades could be machined before heat treating. Grinding time was reduced and sand blasting eliminated.

New machinery at Kearney & Trecker Corp., Milwaukee, dropped the cost of hardening a saddle clamp eccentric from $1.57 to less than a dime.

Costly straightening and cleaning were eliminated, and heat treating costs were slashed to one-seventh of what they were. The new process enabled a switch to be made in steel specifications. Savings: 11 cents on each piece.

More Improvements—A box-type heat treating unit solved a distortion problem for Geo. D. Roper Corp., Rockford, Ill.

The old method of heat treating large, rotary pump gears distorted trunnions considerably. Additional machining and grinding were needed, and the gears were left soft near the hub.

Now, an automatically controlled atmosphere unit holds distortion within 0.004-in. run-out. Less trunnion stock is needed, and grinding time is saved.

With the endothermic furnace atmosphere, the gears stay bright and free of scale. Blasting and pickling are eliminated. It's easier and takes less time for inspectors to find surface defects when there is no scale. The center hole, which formerly had to be cleaned in a separate operation, now needs only washing before assembly.

Still More—At Charles L. Jarvis

Co., North Attleboro, Mass., solid and fluted tap blanks made of molybdenum high-speed steel are hardened—completely free from decarburization.

Several operations usually needed in making taps are eliminated. A battery of small, batch-type electric furnaces (designed for high temperature heat treating of air hardening alloys and high-speed steel) consistently gives a desirable hardening quality.

The accurate control of temperature and protective atmosphere by modern equipment has made rejections due to improper hardening negligible.

Survey shows demand shifts as . . .

Western Steel Needs Rise

WESTERN STEEL markets probably will demand more steel in 1956 than ever before as users refill depleted inventories.

Survey of 1955 — Kaiser Steel Corp., Oakland, Calif., in its annual summary of the western steel market reports: "Steel mill products in 1955 should approximate 6.2 million tons in the seven western states." This compares with 6.1 million tons in 1953's high year.

Kaiser continues: "This 1955 market is particularly impressive since practically all receipts were consumed. In 1953, a substantial portion of the market demand represented inventory receipts."

Rundown for 1954—Biggest percentage of the 1954 western market was tin mill products, which accounted for 18 per cent of the national market. Sheet and strip steel took only 4 per cent. The western market for other product groups was about 10 per cent.

All told, the 1954 demand was down 15 per cent from 1953. Western buyers received 5.2 million tons (9 per cent) of national output.

The Kaiser report states: "It is believed that inventory reduction was a primary reason for this decrease . . . most general economic indicators did not drop so much."

Sources—A little more than one-half of the steel received in several western states comes from local mills. Most of this is structural, plates, bars and bar-size shapes.

"Tubular products, wide flange beams, tin plate and light flat rolled products must be obtained from eastern mills," says the survey. Foreign imports to the Pacific Coast in 1954 were 119,000 tons.

Distribution — Steel consuming areas within the region have definite market characteristics.

Southern California annually accounts for 40 to 45 per cent of the western steel market. It receives about 55 per cent of sheet and strip shipments to the area. Northern California takes about 35 to 40 per cent, much of it in tin plate for canneries.

Oregon and Washington's share of the market is about 15 per cent. Carbon and reinforcing bars predominate in this area because of heavy construction developments.

Arizona, Utah, Nevada and Idaho receive about 7 per cent of total western steel shipments. Sheet and strip steel isn't so important here—there is less metalworking, more heavy construction for power and mining projects.

Market Trends — The Kaiser study reveals significant changes in the importance of major product groups over the last few years.

"Plates, structural shapes and bars have constituted an important part of the western market as resources and industry developed. However, these products which accounted for 45 per cent of the market in 1951, declined to 38 per cent in 1954," says the report.

Sheets and strip have increased as more emphasis is placed on manufacturing and consumer goods and industrial equipment. Standard and line pipe holds relatively steady.

Western Market for Steel Products

From 1951-1954

	1954 Net Tons	%	1953 Net Tons	%	1952 Net Tons	%	1951 Net Tons	%
GROSS TOTAL	5,197,000	100	6,316,000	100	5,415,000	100	6,040,000	100
PRODUCT GROUP								
Plates, Sheared & U.M.	748,000	14	1,108,000	17	939,000	17	1,155,000	19
Structural Shapes	440,000	9	544,000	9	414,000	8	468,000	8
H.R. Bars & Bar Size Shapes	797,000	15	989,000	16	1,030,000	19	1,088,000	18
Sheets & Strip	943,000	18	1,126,000	18	869,000	16	925,000	15
Standard & Line Pipe	392,000	8	530,000	8	475,000	9	453,000	8
Tin Mill Products	894,000	17	895,000	14	867,000	16	876,000	15
All Other Mill Products	983,000	19	1,124,000	18	821,000	15	1,075,000	17

Kaiser Assists Indian Project

A $130-million steel plant expansion is going up at Jamshedpur, India.

Kaiser Engineers Division of Henry J. Kaiser Co., Oakland, Calif., has signed an agreement to assist Tata Iron & Steel Co. Ltd., Jamshedpur, with design, procurement and construction.

The job will require purchase of some $50 million worth of machinery and equipment. It is scheduled for completion by May, 1958, and will increase Tata's ingot production from about 1.3 to 2 million long tons annually. The boost to India's total capacity will be near 45 per cent.

Renegotiation Under Fire

It has outlived its use, may be costing the government money, opponents contend. Congress is investigating, will make its report in May

CHANCES are fair that renegotiation of defense contracts will be allowed to die when the present law expires at the end of 1956.

Chief proponent for continuing the law is the Air Force, while the Army and Navy don't seem to care particularly one way or the other. The only reason for continuation, says one outside-the-government executive: "It's a handy way to cover up errors of judgment."

Fair Prices—The U. S. Chamber of Commerce says that the government "already has devised a whole series of pricing techniques which make it virtually impossible for it to pay more than fair prices."

Specifically pointed out is a section of the Armed Forces Procurement regulations under which the services can put renegotiation (they call it price redetermination) clauses right into a contract. The chamber says: With that provision and other devices, there is no need for a second look at prime contract prices by the route of statutory renegotiation.

Profit Control — Objections to the law: Renegotiation has become a profit control device, which has no place in a civilian economy. Because of this profit control, low cost and efficient producers become reluctant to do business with the government; they turn their talents to the civilian market, and the government is forced to depend on less efficient producers.

The net result is a deterioration of the country's preparedness to shift to war production.

Make or Break? — It's doubted by many that the government ever netted any cash through renegotiation. Some who have studied the subject say the government may have lost money on the deal because:

1. More than half the money "recovered" by renegotiation would have gone to the government anyway in the form of taxes.

2. Cost to companies of administering renegotiation is tax deductable.

3. Some efficient companies have been avoiding defense work, so the government pays more for some things it buys.

4. Direct cost to the government of carrying out renegotiation procedures is high.

The Joint Committee on Internal Revenue Taxation is taking Congress' first real look into the situation in several years. A report is due May 31.

ODM Prepares

Office of Defense Mobilization sets up a disaster plan: If defense production or movement is impeded, materials under contract to the government or materials from the Defense Production Act inventory can be released for specific defense projects.

Meet Cal W. Seeley, new director of the Copper Division, Bussiness & Defense Services Administration. Mr. Seeley is on loan to BDSA from Scovill Mfg. Co. After his six-month hitch in the Copper Division, he'll return to his regular job as Scovill's Philadelphia district manager. He can be reached at room 4806, Department of Commerce, Sterling 3-9200, Ext. 4074.

Progress in Shipbuilding

Clarence G. Morse, Federal Maritime Board chairman, says: "We are confidently looking forward to generating as many as 20 ships a year, minimum, for the next 12 to 15 years. It's a good start from a point back in late 1953 when not a single order had been written for an ocean-going ship in more than a year.

Railroads Get Write-Offs

Heavy railroad buying shows up in the latest batch of certificates of necessity for fast tax write-offs issued by the Office of Defense Mobilization. Of 79 certificates, 45 were for new freight and passenger cars, track, freight yards and similar railroad improvements. All the freight car certificates were issued at an 85-per cent rate.

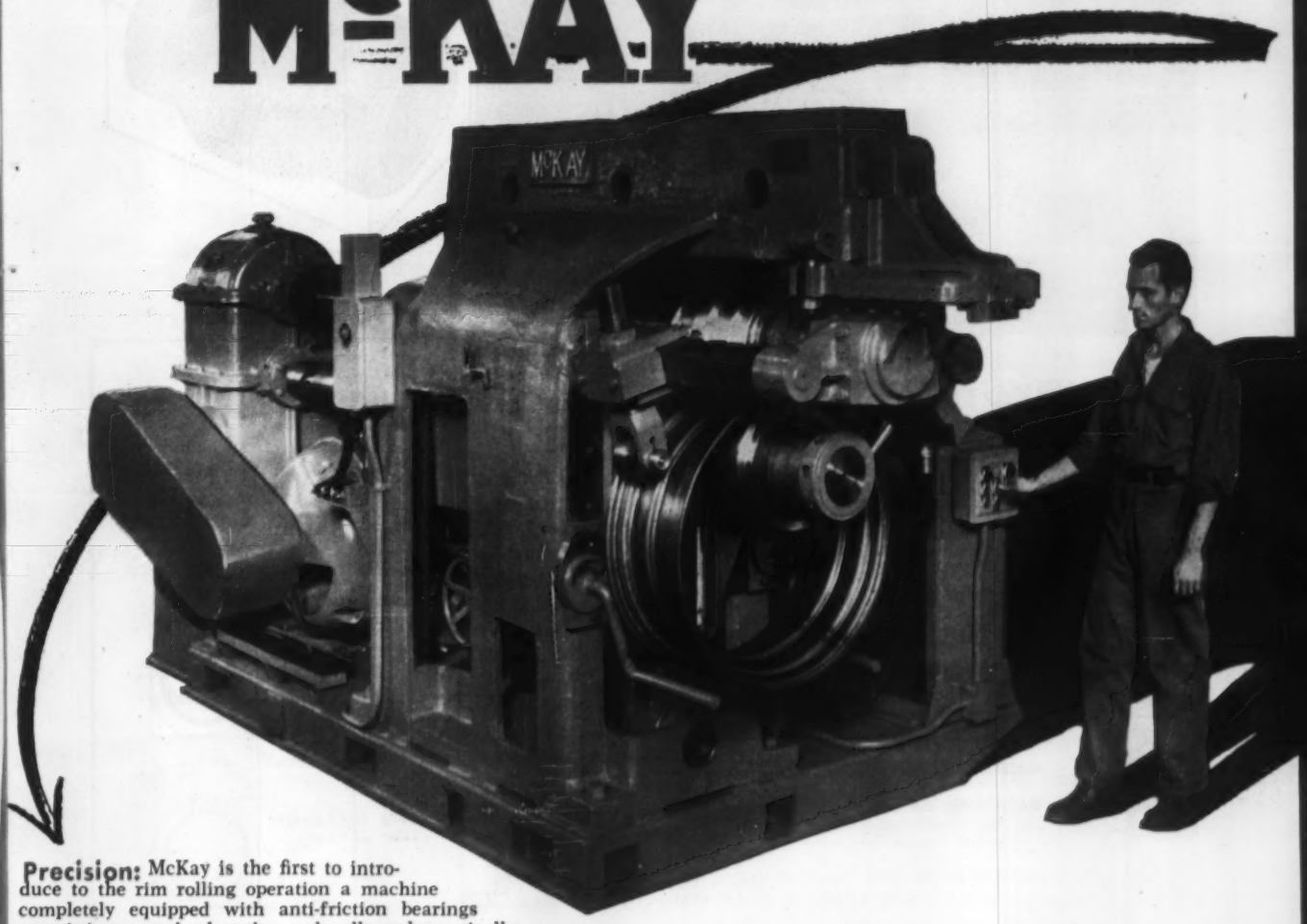
Some of the other major certificates included $12 million for metallurgical coal, United States Steel Corp., 35 per cent allowed; $30 million for electric power generating facilities, Cleveland Electric Illuminating Co., 65 per cent allowed.

Here and There

Defense department joins GSA in setting aside more contracts for small business . . . Patent Office is working on ways to speed up search procedures by use of electronic machines . . . Small Business Administration has made $23.7 million in low interest loans to disaster victims, mostly in the Northeast . . . Navy will set up two more "Texas Towers" (offshore radar warning and weather collection and reporting stations) at a cost of over $16 million. Locations: One about 100 miles southeast of Cape Cod, one about that same distance southeast of New York City. Air Force will operate them.

4 REASONS Why Wheel Manufacturers Specify

McKAY RIM ROLLERS



Precision: McKay is the first to introduce to the rim rolling operation a machine completely equipped with anti-friction bearings permitting more load at the work rolls and practically eliminating maintenance.

Precision setup of work roll shafts is accomplished either manually or by motor-operated screw adjustment of toggles, permitting the exceptional accuracy needed for the production of rims for tubeless tires.

Ruggedness: A one-piece, cast steel housing absorbs all work loads. A 2-Hi, oil-tight gear case drives both work roll shafts through husky universal spindles providing quiet trouble-free operation.

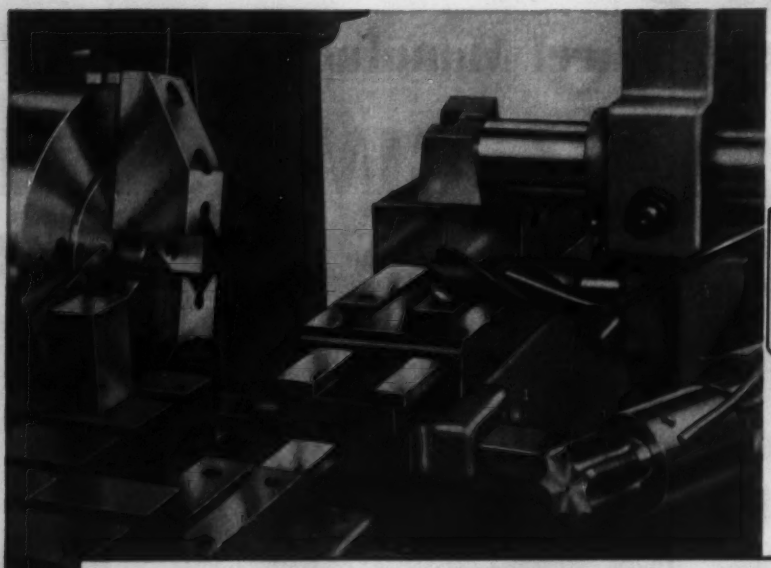
Performance: Accurate, repetitive cycling is assured by solenoid-controlled hydraulic four-way and flow control valves. An electric timer determines the dwell period of the rim rollers under full load at full depth.

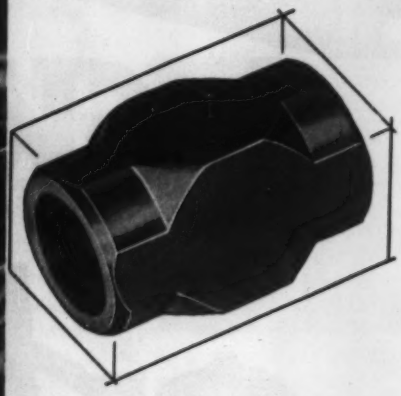
Compact Design: All equipment is mounted on a single base, including the hydraulic power unit and valve panel as well as the electrical equipment and controls. Only 70 square feet of floor space required. A simple connection to your power source and you're in business.

ENGINEERS AND DESIGNERS OF
EQUIPMENT FOR THE AUTOMOTIVE,
FABRICATING AND STEEL INDUSTRIES

McK

The McKAY MACHINE *Company*
YOUNGSTOWN, OHIO





From STAINLESS to STEAM TRAP

machined FROM THE SOLID in just 6.90 minutes

on a P&J 4-U Automatic Chucking Turret Lathe with

POTTER & JOHNSTON ENGINEERED TOOLING

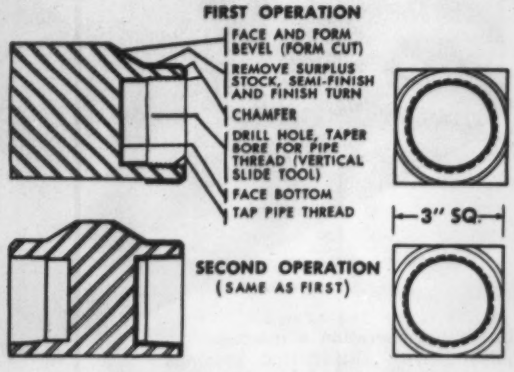
HERE ARE THE JOB FACTS:

PART NAME: Steam Trap Body

MATERIAL: 3" Stainless Steel Cut-Off Stock

MACHINING: 2 Completely Automatic Cycles, 11 Cuts. Each including a Taper Bore and Tapping a Pipe Thread

FLOOR-TO-FLOOR TIME: Only 3.45 Minutes per Cycle; A Completed Piece Every 6.90 Minutes!



HEAVY LINES INDICATE MACHINED SURFACES

But you can't tackle jobs like this *profitably* on machines built for yesterday's easy-going standards. Handling complex cuts and heavy metal removal on tough modern alloys with a speed, economy and accuracy that can meet *today's* (AND tomorrow's) highly competitive standards takes a P&J 4-U Automatic. Here is the advanced design, added rigidity, extra speed and power needed to take full advantage of faster cutting carbide tooling . . . to turn problems into profits!

TAKE ADVANTAGE OF P&J DIRECT-FACTORY SERVICE

To serve you best, all P&J Automatics are made available to you through Potter & Johnston and Pratt & Whitney direct-factory Representatives. For full information on 4-U and other advanced-design P&J Automatics . . . and for expert application and tooling engineering . . . phone or write the P&W Branch Office conveniently near you. There is no obligation for this technical service.

Precision Production Tooling for more than Fifty Years

POTTER & JOHNSTON COMPANY

PAWTUCKET, RHODE ISLAND

SUBSIDIARY OF PRATT & WHITNEY COMPANY, INCORPORATED

MODERNIZE WITH POTTER & JOHNSTON . . . REPLACE FOR PROFIT

Management at Work

Crane's Magos: Engineering Executive

"TOO FEW engineers reaching the point of assuming executive duties are prepared for such responsibilities." That's the belief of John P. Magos, director of engineering and research at Crane Co.'s Chicago works.

Active participation in professional societies and keeping pace with technical progress in your field are not enough, he points out. That's only part of executive development.

Help Yourself—The development he's referring to isn't the company sponsored and directed in-plant training program. He's talking about the individual engineer's efforts to broaden his education and understanding of the business world he lives in.

Mr. Magos didn't pick up that philosophy in a textbook either. He's lived it. Starting as a draftsman for Crane in 1923, he enrolled in night school at Armour Institute of Technology to gain a college education. Fifteen years later—five at Armour and the remainder at University of Chicago—he received a hard-earned bachelor of science degree, with majors in physics, chemistry and mathematics. In 1950, he gained another degree via the night school circuit—this time a master of business administration from U of C's executive program.

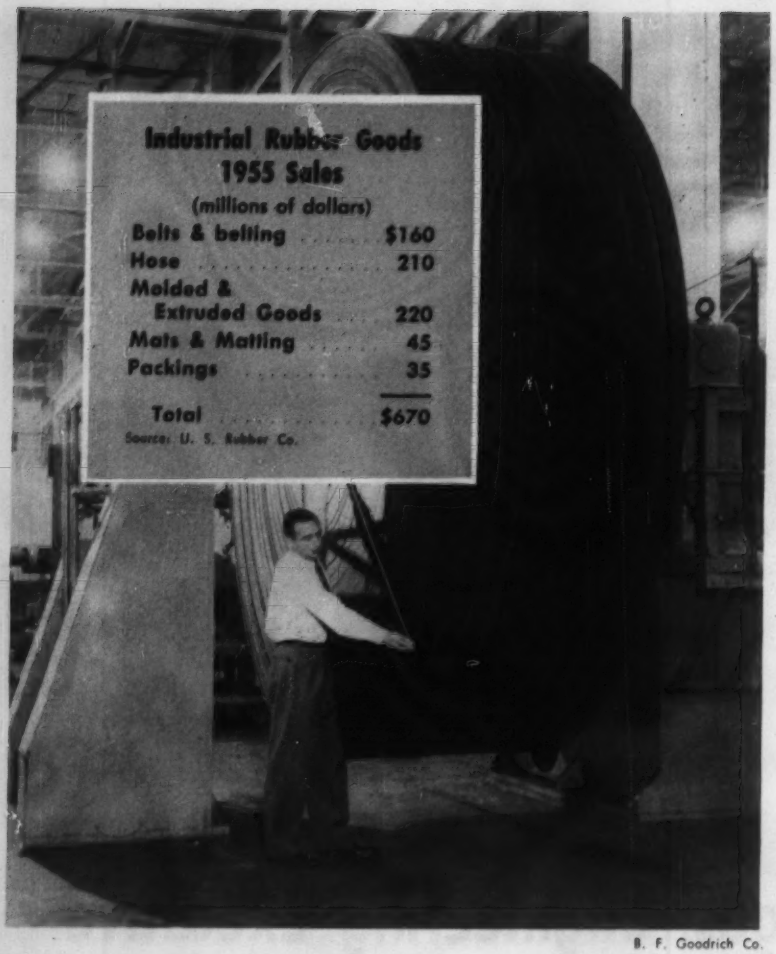
Continuing Education—"During the first few years of practice," Mr. Magos points out, "an engineer's emphasis should be on professional development. At some point, concurrent with further development, he should become aware of the need for broadening his general education—formally or informally—to allow for executive development."

Some of the fields in which Mr. Magos recommends study by the engineer: Accounting, economics, finance, government's role in business, human relations and labor.

Preparation—He's not suggesting that engineers earn degrees in each field. But they can read excellent books or take adult courses to gain basic understanding. With this background, the engineer will be better prepared to accept executive responsibilities and will increase his probability of further success.

Finally, to help round out the engineer's development, he should be ready and willing to participate in such civic affairs as welfare, civil defense, school and youth programs.

All work and no play? That's not Mr. Mago's idea either. For relaxation he likes to read detective novels. He also holds a federal license as a ham—an amateur radio operator.



B. F. Goodrich Co.

Production of belting like this contributes to . . .

Uptrend in Rubber

INDUSTRIAL RUBBER goods sales are stretching out to about $670 million this year.

That's about 12 per cent over 1954. Next year they may go higher, but just how much depends on who's talking. Some of the larger companies say sales will be about the same as this year, possibly 3 or 4 per cent more. Smaller manufacturers claim they look for an 8 to 10 per cent production increase in 1956.

Reason—The Rubber Manufacturers Association, New York, looks for a slight drop in rubber consumption as automobile manufacturers cut back demands for hose and belting between model change-overs.

Some 27 larger companies manufacture most of the hose and belting. The 700 to 800 smaller concerns make mostly molded and extruded goods, plus much of the industrial rubber packing and matting—all of which add up to the $670-million annual sales figure.

Price Peg—Rubber consumption is the peg on which many problems hang. J. F. Joseph, president, Cincinnati Rubber Mfg. Co., Cincinnati, says: "A good rubber plantation can produce 80 to 85 lb of rubber per acre each month. This can be sold profitably at 18c per pound. The current market price is about 40 to 42c per pound.

"Demand exceeds supply," he adds. "Smaller companies like ourselves find the price pretty high. They buy on a day-to-day basis while the larger companies can build up inventories at profitable prices." Mr. Joseph feels that synthetic rubber (selling for about 23c per pound) soon will begin to overcome this price problem.

Goodyear Agrees—On the other side of the fence, President E. J. Thomas of Goodyear Tire & Rubber Co., Akron, says expanding synthetic rubber capacity and progress in the development of manmade rubber should make for more reasonable prices for the natural product.

"The world is using all the natural rubber that can be produced, as well as all the synthetic," Mr. Thomas commented. "Under these tight conditions, the price of natural has soared way beyond the cost of production."

World rubber consumption this year figures to be about 3 million tons. Two-thirds of this is natural rubber. By 1965, world consumption may reach 4 million tons.

Plastic Demand — Plastics are replacing rubber to some extent, especially in irrigation and garden hose, as well as in refrigerator and automotive parts.

Goodyear reports: "The dividing line is melting. Practically everyone in the rubber business is also in the plastics field. Choice of product depends on which does the best job at lowest cost."

U. S. Rubber Co., New York, adds: "With the purchase of synthetic rubber plants by private industry, we can look for a heavy increase in research effort. These new synthetic rubbers will undoubtedly offer the plastics industry strong competition in the race for new markets."

Tight Competition—Despite the high price of natural rubber, problems are minor ones for the industry. Biggest headache is tight competition. Most selling is through jobbers and there just aren't enough to go around. Smaller companies often are forced to sell directly.

Metalworking finds new paths to profit as . . .

Lubrication Goes Scientific

MAINTENANCE COSTS at an eastern steel mill were cut 60 per cent after installation of centralized lubrication systems. Product quality was improved.

Fidings like this are prompting metalworking to take a longer, more systematic look at lubricants. The trend has accelerated steadily since World War II.

New Look—"Steel mill lubrication was once an unscientific hand operation. Now it's a specialized branch of engineering, involving mechanics, chemistry and electrical instrumentation," comments Charles A. Bailey, lubrication engineer, National Tube Division, U. S. Steel Corp., Pittsburgh.

"Modern machinery would clatter to a grinding halt if lubricated with products employed in 1900," explain officials of The Texas Co., New York. "Now industry must have the right lubricant in the right amount in the right place at the right time."

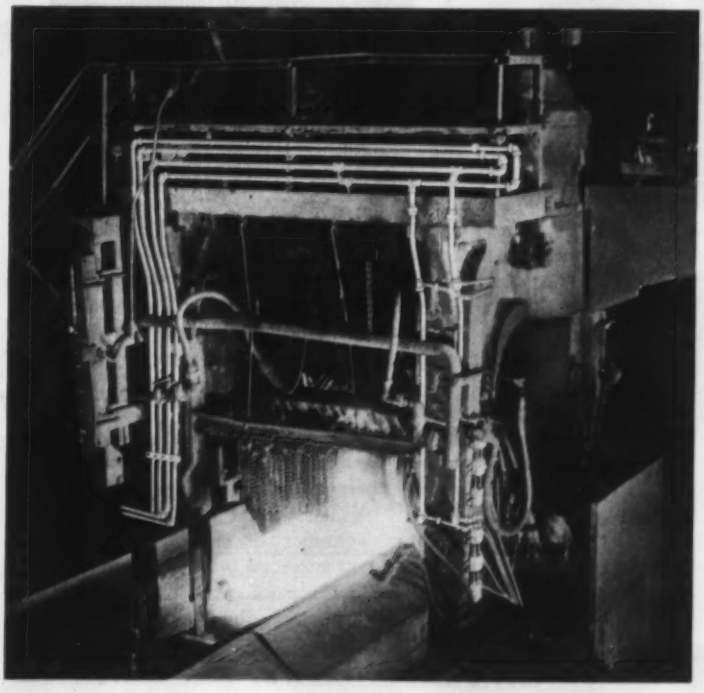
Sales Growth — William P. Youngclaus Jr., administrative secretary, American Society of Lubrication Engineers, Chicago, estimates this year's lubricant volume at close to $200 million. Next year, he adds, should see a further 8-per-cent growth. In 1940, 36.8 million barrels of petroleum lubricants were produced. Use in 1950 was 51.7 million; in 1954, 53.2 million, according to the Bureau of Mines.

In steelmaking, greater loads, closer tolerances and faster mill speeds combine to demand new and versatile lubricants. "Mills no longer function on the cheapest lubricant obtainable," says Richard Fulton, resident engineer, Standard Oil Co. of Ohio, Cleveland. "Lubrication engineers demand quality performance." Add development engineers at Gulf Oil Co., Pittsburgh: "Many mills have lubrication engineers and research departments. Before World War II, there were none."

Looking Ahead — "Centralized lubrication is necessary to maintain the high production that steel mills are turning out," assert officials of Farval Corp., Cleveland. Centralized systems are also gaining popularity in nonferrous mills. Military uses demand other improvements—right now, the Air Force is asking for lubricants that will function over a temperature range from minus 120 to plus 1500° F.

Increased emphasis is being placed on additives, which can boost lubricant performance for many metalworking jobs. Officials of Climax Molybdenum Co., New York, say that sales of molybdenum sulphide, one effective additive, are well above 1954 and should be better in 1956. Lubrizol Corp., Cleveland, does a thriving specialist job in additive research and production.

Trends—The growth of lubricant sales has not been as rapid as the growth of metalworking. Reason: As oils and greases are improved, less are needed for a given application. And in machine design, the accent is on better lubrication rather than sheer lubricant quantity. But lubrication engineers feel they are on their way to winning their biggest battle — making known what they can do for industry. They are confident that they can rely on their own product development to do the rest.



Mesta blooming mill fitted with Farval centralized lubrication

Wheeling Steel Expands

Wheeling Steel Corp., Wheeling, W. Va., will boost its steelmaking capacity nearly 13 per cent.

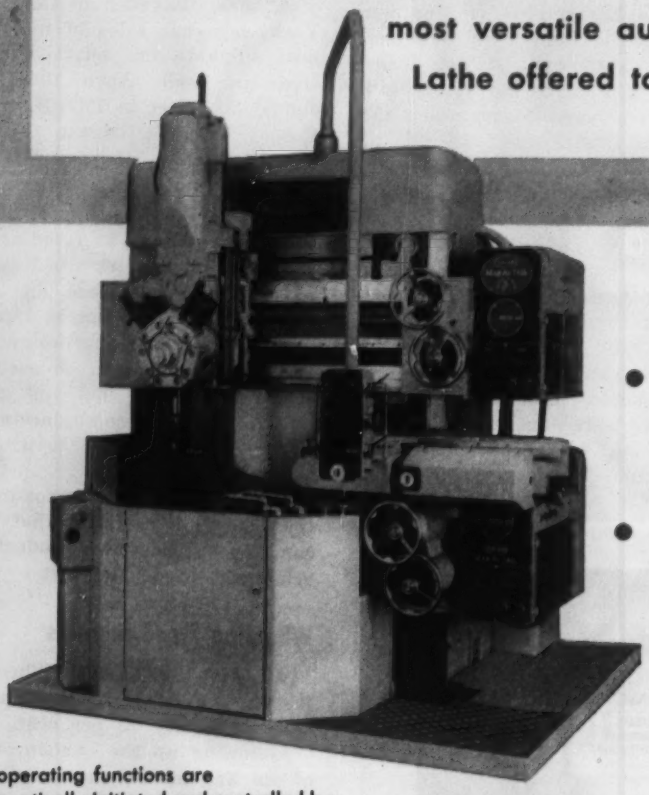
Following up the announcement of its $65-million expansion program, Wheeling Steel reports ingot capacity will increase at least 270,000 tons. Present capacity is 2.1 million tons annually.

The company will install two oxygen-blown converter furnaces at its Steubenville, O., works. They will be similar to the furnaces Jones & Laughlin Steel Corp. will put into its Aliquippa, Pa., plant.

Wheeling also plans to increase its output of strip and sheet steel, tin plate and steel pipe. The projects, expected to be completed in the next two or three years, come under the company's long-range construction and improvement program.

don't BUY BULLARD *unless* YOU WANT THE BEST!

Yes, Bullard Cut Master, Model 75 with Man-Au-Trol Conversion Unit is the best . . . most versatile automatic Vertical Turret Lathe offered to industry today . . . . .



BULLARD

All operating functions are automatically initiated and controlled by one function control drum and two detector drums in Man-Au-Trol: Table Speeds (20 Available), Feeds (16 Available), Head Travel in feed or traverse, right or left, up or down or 45° in any quadrant and Turret Indexing.

Since the function control drum can be pre-set for a given job in advance, the machine down time for job change-over is reduced to a minimum.

The Man-Au-Trol Conversion Unit can be applied to any or all heads of Cut Master, Model 75 right in your plant.

Your Bullard Sales Engineer will be glad to explain the many other advantages offered by Man-Au-Trol — your best buy in an automatic vertical turret lathe — call him or write for our new catalog.

THE BULLARD COMPANY
286 Canfield Avenue • Bridgeport 2, Connecticut

Please send me a copy of the
NEW MAN-AU-TROL, MODEL 75 CATALOG

NAME_____

COMPANY_____ POSITION_____

ADDRESS_____

CITY_____ ZONE_____ STATE_____

GM workers assemble blades in an impeller of the coupling added this year on the Hydramatic

Hydramatic Shifts Gears

IF YOU'RE looking for an example of where design, engineering and production ingenuity are uniquely combined, check GM's Detroit Transmission Division and its new Hydramatic.

In this case "new" carries more then the usual Motor City validity, since the redesign is so extensive that there is no interchangeability of significant components with the former version.

The Job—The basic business of transmissions, in addition to the operations of disengaging the engine from the drive shaft and reversing shaft rotation, is to change the torque-speed ratio between the engine and the rear axle. That can be done electrically, mechanically or hydraulically, or by any combination of the three.

In contrast with Dynaflow, which is purely hydraulic, and Powerglide, which is a hydraulic-mechanical split, Hydramatic has traditionally been predominantly mechanical. Powerflow is divided into about two-thirds mechanical drive and about one-third fluid drive. This was done to give the optimum in performance.

To get this performance, shifting of the planetary gears has been accomplished through simultaneous release and application of brake bands and clutches. But the servo-operated clutch and band transmission, while achieving the performance objective, also required some compromise with smoothness. While this characteristic didn't bother Cad-Allard drivers or the Lincoln team in the Mexican road race, it was noticeable when there was nothing around to beat.

Below Surface—The newness of the new Hydramatic may not be so apparent, since the device retains dual range with four forward gear steps and reverse.

Mechanically, the unit continues such factors as the fluid coupling and three planetary gear sets which have all been modified. But the mechanism has been greatly simplified by the use of one-way sprag clutches and a new fluid coupling which replace the bands and servo-mechanism of the first two planetary gear sets.

Operation—From the operational standpoint that means the second fluid coupling does the job which formerly was done through co-ordination of band and clutch release. Thus, in first gear with the sprag clutch of the front unit on, the shift to second is achieved

(Material in this department is protected by copyright, and its use in any form without permission is prohibited.)

by the fluid coupling filling with oil to take up the drive. In the shift to third, the fluid coupling empties as the rear clutch takes hold—again driving through the front sprag clutch, and the fluid coupling fills once again for the shift into fourth.

The fluid coupling is thus a dump-and-fill-type clutch member, replacing the former front unit clutch. The use of this unit with two sprag clutches replaces the two friction clutches and one of the bands previously used. That leaves only one band which does not require adjustment. Either filling or emptying on each shift, the fluid coupling clutch blends the shifts, but performance is almost unaffected, since the mechanical shifts still take place.

Aluminum—In addition to these changes, a new aluminum bell housing is supplied, and aluminum is also used in the rear bearing retainer. The case is completely redesigned to provide clearance for anticipated lower floor pans, including relocation of the valve body on the bottom of the transmission where it is accessible for service by removal of the oil pan. The rear pump and governor are entirely new, and provision is made for oil cooling. That indicates the design is expected to last for a number of engine and body changes.

New Tooling—Extensive retooling was undertaken for the job, including revision of one final assembly line to pedestal-type conveyors with heads permitting full rotation of the unit during assembly. Production of the former Hydramatic unit is continued for service, certain General Motors divisions and outside customers. The change-over will be gradual. But with retooling still under way, production of 240 transmissions an hour is being maintained, with an increase to over 300 hourly by mid-1956 planned.

Impressive in itself, this figure becomes more remarkable when it is appreciated that Hydramatics are profusely sprinkled with precision parts. Most units for example, contain 23 gears, including ring gears, sun gears, pinion gears, pump gears, speedometer drive gears and starter gears. That adds up to about 1 million gears annually (the division claims industry's gear production championship). With most gears having tolerances measured in tenths of a thousandth of an inch, the average daily output of 151,850 cog wheels is highly impressive.

Mechanization—Within the next few months, it will become even more so. Pinion gear blanks from Detroit Transmission's screw machine department will be washed and loaded into a hopper. From there, automatic handling will take over.

Parts will move through a machine which chamfers the bore faces. Then they will enter a lift and drop down a chute where both hole-shoulder surfaces are ground; next into a zig-zag type of storage unit which has a capacity of perhaps 2000 gears; and then into a machine where both ground faces are lapped and automatically gaged to 0.0002 in. Conveyors then join operations, which include, successively, honing of the hole, hobbing and shaving.

Steps—Run through heat treat in groups, the gears emerge to enter the conveyors once again for grinding of a chamfer on the acute angle side of each helical tooth, grinding of an oil groove in the hole shoulder, vapor blasting to remove heat-treating scale, finish honing of the hole and, finally, burnishing of the tooth surfaces.

Other examples of materials handling changes can be found in most areas of the plant, often tying standard production machines together as in the gear department. The intermediate shaft is moved through a sequence of four centerless grinders by a conveyor.

Special—But equally impressive are special-purpose installations supplementing or replacing former setups on multiple-purpose equipment. A good example is found in the new rear-bearing retainer. Formerly of cast iron, this part received rough and finish bores, face turning and grooving on Bullards. It was then passed by gravity conveyor to a Sundstrand lathe for further semifinish and finish boring and turning; finally moving to an Ex-Cell-O double-end, four-spindle boring machine for finishing.

Today, the rear bearing retainers are handled on a Sundstrand transfer machine of the indexing pallet type. Loaded into the pallets by the operator, they progress through 16 work stations, which include washing and gaging the holes, to be ejected at the 17th station onto a conveyor. One such machine is presently in operation, and a second is being installed adjacent to it. They will share a common pallet supply.

Transfer—Perhaps the high spot is the newly installed case transfer machine which is 390 ft long and includes 250 stations. Iron case castings which weigh 65 lb on entering this behemoth emerge a slim 44 lb, following Greenlee, Ex-Cell-O and Ingersoll reducing treatments. About 100 operations are performed in the process. (Handwriting on the wall: The equipment is capable of handling aluminum should the need arise.)

Only two years ago victim of one of the most disastrous fires in industry's history, the division recently produced its 7 millionth Hydramatic transmission. Although output began in June, 1939, when Hydramatic was introduced, about one-third of that total was produced since the fire, and the trend is right on up.

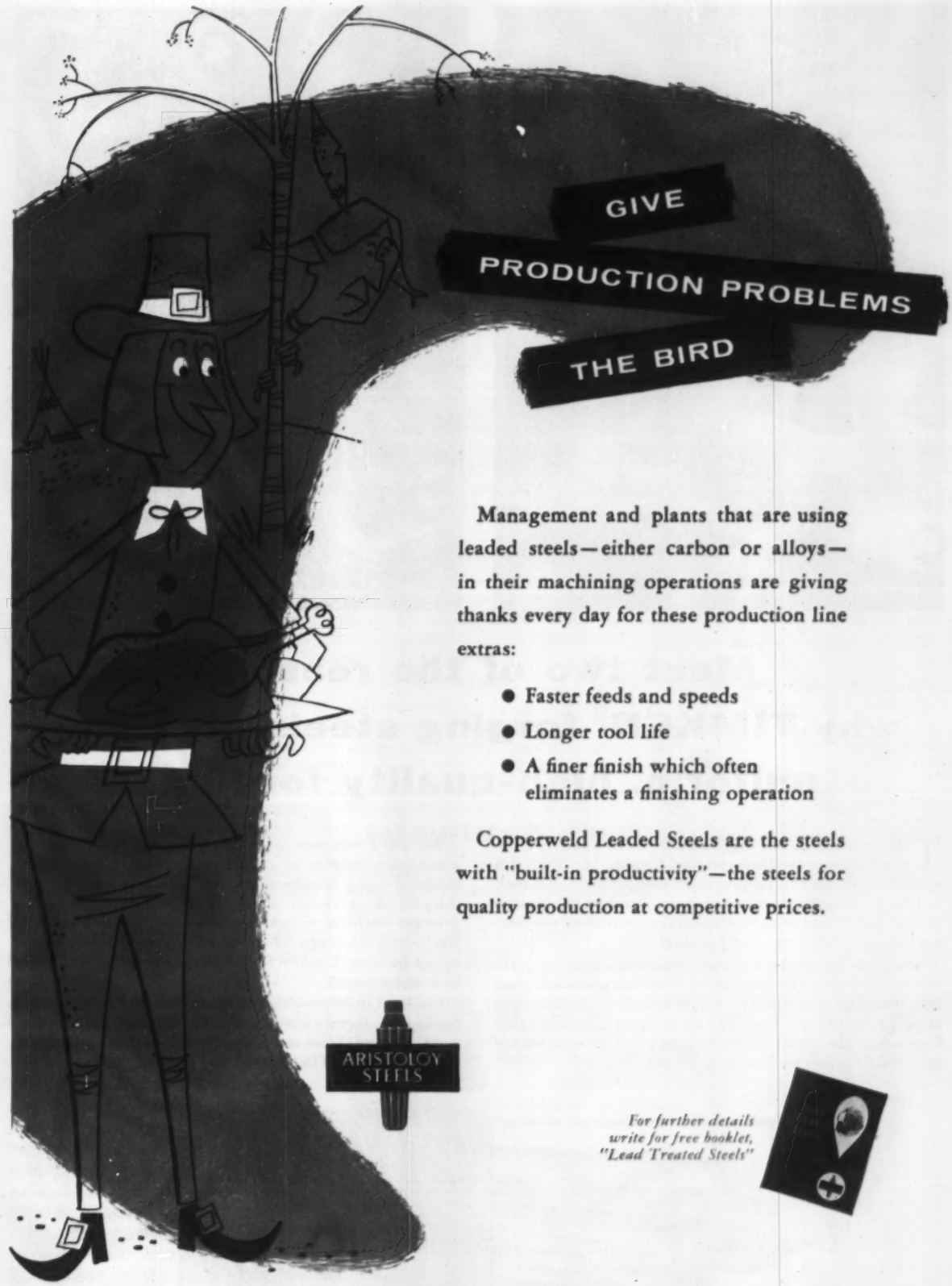
U. S. Auto Output

Passenger Only

	1955	1954
January	659,719	456,765
February	675,769	443,257
March	794,188	526,076
April	754,007	533,470
May	724,891	494,250
June	649,372	504,811
July	659,979	441,451
August	614,392	436,650
September	461,592	285,860
October	517,696†	236,635
November	.....	508,466
December		641,971
Total		5,518,662

Week Ended	1955	1954
Oct. 22	137,425	45,649
Oct. 29	158,430	68,649
Nov. 5	162,278	92,766
Nov. 12	180,754	116,285
Nov. 19	176,996	133,969
Nov. 26	155,700*	111,910

†Preliminary *Estimated by STEEL
Source: *Ward's Automotive Reports*



Management and plants that are using leaded steels—either carbon or alloys—in their machining operations are giving thanks every day for these production line extras:

- Faster feeds and speeds
- Longer tool life
- A finer finish which often eliminates a finishing operation

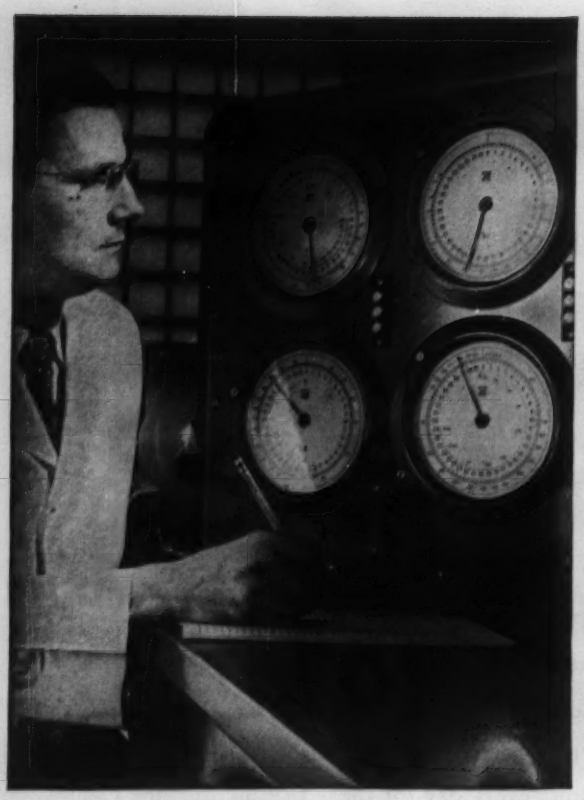
Copperweld Leaded Steels are the steels with "built-in productivity"—the steels for quality production at competitive prices.

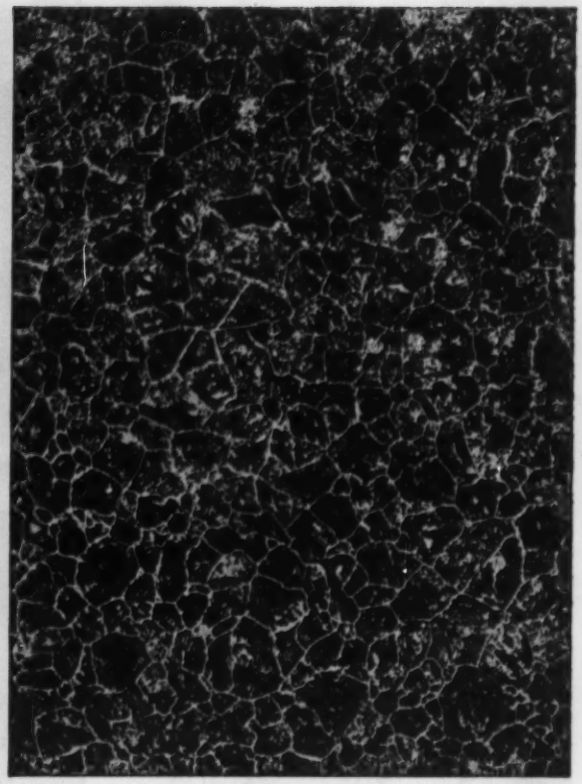
ARISTOLOY STEELS

For further details write for free booklet, "Lead Treated Steels"

COPPERWELD STEEL COMPANY • STEEL DIVISION • WARREN, OHIO

EXPORT: Copperweld Steel International Co., 117 Liberty St., New York 6, N. Y.





Meet two of the reasons why TIMKEN® forging steels give you uniform, high-quality forgings

THE man on the left helps assure you of uniform composition in every Timken® steel forging bar. With this spectrometer, he can tell the exact composition of a melt in just 40 seconds. Results are flashed back to the furnace so the melter can maintain constant control of the heat analysis up to the instant of pouring.

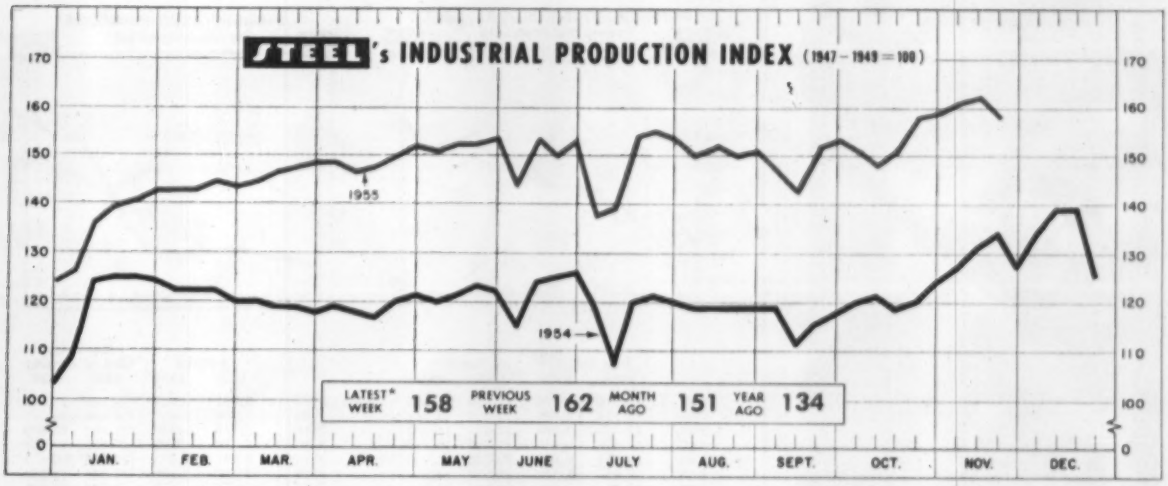
The photomicrograph at right shows the uniform grain size of the Timken forging steels. Uniform grain size after heat treatment is assured by spectrometric or microscopic examination of every heat. The result—you can be sure that forgings made from Timken forging steels have uniformly high ductility and resistance to impact.

But that's only part of the story. You can hold rejects to a minimum because we condition the steel to fit your particular forging requirements. And you save steel because the good dimensional tolerances of Timken forging steels produce uniform weight multiples with a minimum of steel lost in flashings. You even have fewer furnace adjustments because Timken forging steels respond uniformly to heat treatment.

For help in improving the quality of your forgings and cutting production costs, write: The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING



*Week ended Nov. 19. Based upon and weighted as follows: Steel Output, 35%; Electric Power Output, 32%; Freight Car Loadings, 22%; and Auto Assemblies, 11%

Personal, Capital Spending: Record GNP

GROSS NATIONAL PRODUCT is still rising.

Look for it to hit an annual rate of about $395 billion or more in the fourth quarter. For the year, GNP probably will hit close to $387 billion.

Continued Confidence — The country's total output of goods and services (GNP) advanced to a record annual rate of $391.5 billion in the third quarter, some $6.5 billion higher than the second quarter rate. And it hasn't reached its peak. It should continue up through the first quarter of next year and likely into the second half.

Here are a couple of good reasons who GNP will hold high in early 1956:

Money in the Pocket—Personal consumption expenditures for durable and nondurable goods and services have come way up. So has private investment. Both indicate that individuals and companies are making more and spending more—a lot of it for plant expansion and equipment. And they'll have to keep on producing to pay for their purchases.

Personal consumption expenditures rose to an annual rate of $356 billion in the third quarter, $5.5 billion over second quarter rate. In 1954, the annual rate was $236.5 billion.

Dollars To Invest—Fixed private investment rushed along at an annual third quarter rate of $58 billion, $2 billion better than in the preceding quarter. Business outlays indicate it will continue strong well into 1956.

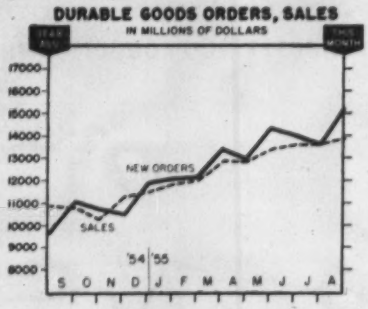
Government spending for national security, often a bolster to a slipping economy, has dropped from a high 1953 annual rate of $51.4 billion to a steady average quarterly rate of $40.7 billion. It probably will hold through this year, but may slip slightly in 1956. In any case, less defense money going out and high tax receipts coming in probably will mean the government can balance its budget in fiscal 1956. That factor is a

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,389[1]	2,394	1,915
Electric Power Distributed (million kw-hr)	10,800[1]	10,878	9,197
Bitum. Coal Output (1000 tons)	9,800	10,100	8,765
Petroleum Production (daily avg—1000 bbl)	6,730[1]	6,809	6,220
Construction Volume (*ENR*—millions)	$401.7	$267.9	$301.8
Auto, Truck Output, U. S., Canada (*Ward's*)	211,632[1]	215,221	160,149
TRADE			
Freight Car Loadings (1000 cars)	710[1]	797	709
Business Failures (Dun & Bradstreet, no.)	200[1]	207	227
Currency in Circulation (millions)[3]	$30,794	$30,657	$30,233
Dept. Store Sales (changes from year ago)[3]	+9%	+1%	−2%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$20,045	$18,272	$18,925
Federal Gross Debt (billions)	$279,714	$279,751	$278,740
Bond Volume, NYSE (millions)	$17,742	$15,931	$22,477
Stocks Sales, NYSE (thousands of shares)	12,430	9,351	16,791
Loans and Investments (billions)[4]	$85,259	$85,623	$84,424
U. S. Govt. Obligations Held (billions)[4]	$30,300	$30,599	$37,377
PRICES			
STEEL's Finished Steel Price Index[5]	208.90	208.90	194.53
STEEL's Nonferrous Metal Price Index[6]	265.1	264.0	218.3
All Commodities[7]	111.1	111.2	109.5
Commodities Other than Farm & Foods[7]	119.1	119.1	114.5

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1955, 2,413,278; 1954, 2,384,549. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100

DURABLE GOODS ORDERS, SALES
IN MILLIONS OF DOLLARS

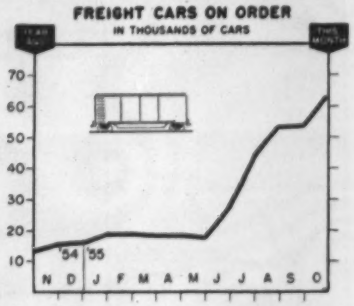


	New Orders*		Sales*	
	1955	1954	1955	1954
Jan.	12,142	9,376	11,850	11,381
Feb.	12,170	9,394	12,029	11,248
Mar.	13,353	9,585	12,860	11,303
Apr.	12,879	9,619	12,805	11,160
May	14,331	9,588	13,322	11,066
June	14,033	9,822	13,527	11,293
July	13,571	9,407	13,503	11,153
Aug.	15,219	9,756	13,852	10,907
Sept.	.....	11,153	.....	10,832
Oct.	.....	10,790	.....	10,295
Nov.	.....	10,491	.....	11,314
Dec.	.....	11,963	.....	11,570

*Seasonally adjusted. U. S. Office of Business Economics

Charts copyrighted, 1955, STEEL

FREIGHT CARS ON ORDER
IN THOUSANDS OF CARS



	Awards		Backlogs (end of month)	
	1955	1954	1955	1954
Jan.	5,087	2,942	18,395	27,959
Feb.	2,690	2,057	18,633	25,441
Mar.	2,156	348	17,974	20,966
Apr.	2,706	909	17,930	17,817
May	3,041	1,071	16,886	15,615
June	13,365	1,139	27,102	13,860
July	18,007	883	42,888	12,889
Aug.	13,405	2,425	52,803	13,013
Sept.	3,228	2,396	52,913	11,993
Oct.	12,843	2,704	61,954	12,853
Nov.	.....	3,754	.....	14,805
Dec.	.....	2,685	.....	15,317
Total	.....	23,313		

American Railway Car Institute

good strong business stabilizer.

Good Year Ahead—So it looks like high fourth and first quarters. Even inventories, the soft spot in 1953, are doing their part. They may continue to climb, but it won't be a source of trouble (See STEEL, Nov. 21, p. 65).

Forecasters Cite Claims

The Committee of Technical Consultants, Business Advisory Council, has told Sinclair Weeks, Commerce secretary: "1956 will show a higher rate of activity than 1955."

Just how high is still a bone of contention. William F. Butler, economist for Chase Manhattan Bank, New York, told a meeting of forecasting economists at the University of Michigan, Ann Arbor: "Automobile sales might drop 10 per cent; so might residential construction. But capital expenditures by businessmen on new plant and equipment should rise more than 10 per cent." He looks for a 1956 GNP rate of $400 billion.

V. Lewis Bassie, onetime Commerce department economist and currently director of the Bureau of Economic and Business Research at the University of Illinois, disagrees with Mr. Butler's claims.

Mr. Bassie argues that the U. S. is top heavy with prosperity. "Businessmen construct new plants on the basis of projected sales," Mr. Bassie explains. "These projections are superheightened by optimism."

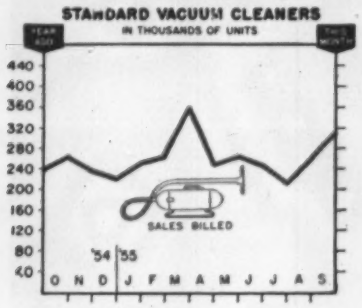
What would precipitate a downturn? Mr. Bassie believes auto production is the key. A down trend in car production can lead the way into a recession, he says.

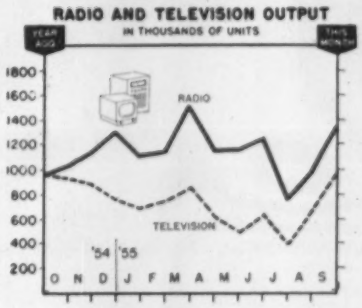
Income Keeps Coming In . . .

Personal income currently is at an annual rate above $300 billion (it was $307.5 billion in September), according to the Commerce department. Earnings of manufacturing workers are the pacesetter. Weekly wages (September) average $77.90, almost $10 above the weekly average for 1952.

A pretty good idea of the way things are going is indicated by a statement from the Material Handling Institute Inc., Pittsburgh. "Bookings for fourth quarter are expected to continue high in line with the current sharp upward movement of outlays for new plants and equipment."

Orders for the first nine months already equal 90 per cent of total 1954 bookings. Chances are they'll





	Sales Billed—Units		
	1955	1954	1953
Jan.	250,123	221,233	255,886
Feb.	262,651	199,035	246,007
Mar.	358,179	276,464	329,294
Apr.	244,143	220,849	268,548
May	261,238	200,434	252,404
June	241,665	195,781	197,506
July	207,758	193,607	159,446
Aug.	255,540	185,397	188,536
Sept.	308,345	238,235	227,253
Oct.	.....	263,197	249,383
Nov.	.....	237,882	216,227
Dec.	.....	217,022	190,773
Total	.....	2,658,136	2,781,263

Vacuum Cleaner Mfrs. Assn.

	Radio		Television	
	1955	1954	1955	1954
Jan.	1,068	872	655	421
Feb.	1,090	769	703	427
Mar.	1,482	940	831	600
Apr.	1,100	745	583	458
May	1,114	722	467	396
June	1,205	838	590	544
July	718	438	344	307
Aug.	948	785	648	633
Sept.	1,302	932	940	948
Oct.	....	998	...	921
Nov.	....	1,099	...	859
Dec.	....	1,262	...	833
Total	....	10,400	...	7,347

Radio-Electronics-Television Mfrs. Assn.

go to 120-125 per cent of 1954 totals when the new year comes.

Freight Cars Roll Along . . .

Even freight car orders, a slow starter, are holding the pace.

October orders jumped from a September slump of 3228 to 12,843, as individual lines kept up the buying spree to help boost shipping along. Lifting of government restrictions on railroads in the coming year most likely will keep railroaders coming back for more cars all through 1956.

Walter J. Tuohy, president of Chesapeake & Ohio Railway, announced that C & O will boost its freight car fleet by 6000 cars, most of them coal carriers.

In explaining why C & O believes in a good business future, Mr. Tuohy said: "Total overseas export of coal from the U. S. probably will reach 32 million tons this year, more than double the 15.3 million tons of 1954."

One minor flaw in the picture is the increased number of business failures. Dun & Bradstreet reports that the 919 failures in October reached a postwar high, 12 per cent more than September and 6 per cent up from a year ago.

This is in contrast with the tendency for fewer failures in the fall months just before Christmas, but it seems likely that the number of failures will decrease until after the first of the year. Then the post-holiday slump may take its toll.

More Businesses Incorporate . . .

On the other hand, new business incorporations have risen steadily this year as more people venture into the business ring to collect a share of the profits.

At ten months, incorporations stood at 117,955 compared with 95,448 for the same period last year. Chances are the increase will continue through the rest of this quarter.

Trends Fore and Aft . . .

Leece-Neville Co., Cleveland, maker of electrical equipment for automotive and allied industries, reports that fractional horsepower motors will account for greatly increased sales in the months ahead . . . Gardner-Denver Co., Quincy, Ill., adds that incoming orders suggest business will remain high for the rest of the year. The company plans to buy more tools and facilities to boost 1956 output of its air compressors, air tools and other products.

MONEL • NICKEL • COPPER • ALLOYS
THIN STRIP
±.0004" is run-of-the-mill

Typical of the care that assures absolute uniformity in all Somers THIN STRIP is this 4-high mill equipped with the latest electronic gages and controls. Here thickness is constantly checked throughout the run, and maintained within ±.0004" or less on gages from .010" down. The slightest variation may be instantly corrected.

No matter how exacting your requirements may be for thin strip metal, you can depend on Somers quality control, equipment and experience to guarantee uniform quality every time—all the time.

Somers Brass Company specializes in rolling nickel and its alloys from .020", and copper and its alloys from .012" both down to .00075".

If you now have, or anticipate, a problem with exacting standards of this strip metal write:

FOR EXACTING STANDARDS ONLY
Somers
Somers Brass Company, Inc.
WATERBURY, CONN.

Cost-Cutting Chain Reaction Triggered by SPEED CLIP®!

Savings for the parts supplier, the television manufacturer and the ultimate user! That's the triple play that begins every time Centralab, division of Globe Union, Inc., Milwaukee, Wis., assembles a "Snap-Tite" television control. Here's why: There's a job-engineered Tinnerman SPEED CLIP in every control assembly.

A simple two-at-a-time hand operation speeds assembly of controls to chassis for an amazing 73 per cent savings in time. No special skills or tools are required. Spring steel fingers of the SPEED CLIP snap past the panel as inserted . . . hold the controls firmly in place and automatically spaced away from the chassis. Removal for service is simply a matter of pinching the spring fingers inward and slipping the control free.

Another example of Tinnerman fastening know-how, this part is just one of more than 8,000 SPEED NUT brand fasteners designed to make standard or complex attachments. SPEED NUTS can bring savings to you, too. See your Tinnerman representative soon and write for your copy of "SPEED NUT Savings Stories".

TINNERMAN PRODUCTS, INC. • BOX 6688, DEPT. 12, CLEVELAND 1, OHIO

Canada: Dominion Fasteners, Limited, Hamilton, Ontario. *Great Britain:* Simmonds Aerocessories, Limited, Treforest, Wales. *France:* Aerocessoires Simmonds, S. A., 7 rue Henri Barbusse, Levallois (Seine). *Germany:* Hans Sickinger GmbH "MECANO", Lemgo-i-Lippe.

TINNERMAN Speed Nuts®

FASTEST THING IN FASTENINGS®

Special SPEED CLIP gives desk extra model flexibility and saves money.

Adjustable awning assembled in 63% less time with special SPEED NUTS.

SPEED NUTS lower assembly costs 40% on casement-window air conditioner.

More than 8000 shapes and sizes

CHARLES F. MYERS
. . . Morse Twist Drill president

RANSOM B. De LISLE
. . . Niagara Machine & Tool p. a.

HIRAM B. WARNER
. . . manages McLouth Steel plants

Morse Twist Drill & Machine Co., subsidiary of Van Norman Co., at New Bedford, Mass., elected **Charles F. Myers** president, **James Y. Scott** chairman of the board, **J. J. Hayes** executive vice president-general manager. Mr. Myers was vice president-sales.

William G. Harter, effective Dec. 1, becomes vice president and treasurer of **Continental Steel Corp.**, Kokomo, Ind., to succeed **Urlin K. Becker** who will retire. **S. C. Land** will be secretary and **George V. Reed** assistant treasurer.

G. W. Reese was named vice president-manufacturing for **American Can Co.**, New York. He was vice president in charge of the Atlantic division.

Jesse A. MacIntire Jr., Chicago district manager, was promoted to manager, wire braid hose sales for **Republic Rubber Division**, Lee Rubber & Tire Corp., Youngstown. He is replaced at Chicago by **Irving G. Wollter**, formerly a field representative in Chicago.

Donald C. Duncan was made general manager, Berkeley Division, **Beckman Instruments Inc.**, at Richmond, Calif. **Thomas Allinson** was made manager. He reports to Mr. Duncan and continues as general manager of the Helipot and Arga Divisions in South Pasadena, Calif.

Ransom B. De Lisle joined **Niagara Machine & Tool Works**, Buffalo, as purchasing agent. He was formerly associated with Pittsburgh Metallurgical Co. Inc. as general purchasing agent and traffic manager, and with New York Central System's engineering department.

Frederick A. Wunderlich was made general operating manager-manufacturing, **Chrysler Division**, Chrysler Corp., Detroit. He has been general works manager since 1948.

John F. Crowell was appointed sales manager of the **Centra-Point Division** of William H. Field Co. Inc., Boston, formed to manufacture and sell the firm's new end mill grinder.

Allegheny Ludlum Steel Corp. appointed **Clifford W. Briggs** production control manager and **Charles G. Hathaway** customer service manager at its Brackenridge, Pa., plant.

Don P. Carr, as assistant to the manager of **Crucible Steel Co. of America's** tool steel sales division, is responsible for sales in the West Coast sales division. He has offices in Los Angeles.

Charles Saso was made vice president and plant manager of **Technion Design & Mfg. Co. Inc.**, New York.

Hiram B. Warner, as plant manager, directs operations of **McLouth Steel Corp.'s** Trenton and Gibraltar, Mich., plants.

Seymour Blechman was elected executive vice president of **Brooks Rotameter Co.**, Lansdale, Pa. He was vice president-sales manager at Fischer & Porter Co.

William E. Muther was made manager of manufacturing and estimating for **Rucker Co.**, Oakland, Calif. He was chief engineer of Oakland Machine Works.

National Wire Products Corp., Baltimore, elected **E. V. Reckley** vice president-sales.

Richard F. Trimbach was made manager, new product development, **Loewy Construction Co.**, division of Baldwin-Lima-Hamilton Corp., New York.

Kenneth L. Snover was made assistant to the vice president-manufacturing for **International Business Machines Corp.**, New York.

Kenneth Michel was made general manager of the new Sunex division of **Sun Tube Co.**, Hillside, N. J., formed to manufacture aerosol valves, polyethylene bottles and plastic closures. He is succeeded as sales manager, impact extrusion division, by **Richard McCarthy**. **Donald Goff** was made production

RAY C. REINHARTSEN
. . . Ekstrom, Carlson gen. sales mgr.

C. R. TERPENING
. . . Rimat Gage sales manager

EARL M. DOUGLAS
. . . new vice president of Dana Corp.

manager of the Sunex division. **Claude Alexander,** production manager of the Washington plant, now makes his headquarters in Hillside as assistant to the president.

Ray C. Reinhartsen was made general sales manager, **Ekstrom, Carlson & Co.,** Rockford, Ill. He was vice president-general manager of Onsrud Machine Works Inc. Named exclusive representatives to the aircraft industries are **Fred J. Heid** (eastern United States) and **G. R. Gordon** (western United States). Mr. Heid for the last eight years served as general sales manager. Mr. Gordon was assistant chief tool engineer in charge of manufacturing research for Convair, division of General Dynamics Corp.

Weirton Steel Co., Weirton, W. Va., division of National Steel Corp., appointed **William Zatezalo** assistant to the manager, steel works department.

Coffing Hoist Division, Danville, Ill., Duff-Norton Co., appointed **Andrew M. Kelly** manager of a new customer service department.

Donald B. Roberts was made Missouri Valley division manager for **Permacel Tape Corp.** He has headquarters in St. Louis.

J & S Steel Corp., Chicago, appointed **L. C. Beckerich** assistant to the vice president. He will assist in procurement of materials and is responsible for sales in the Indiana-Michigan area.

C. R. Terpening fills the new post of sales manager, **Rimat Gage Co.,** Pasadena, Calif. His former associations are Pratt & Whitney Division, Niles-Bement-Pond Co., and Sheffield Corp.

Harold Scrutton was made Southeast district manager for **Hobart Bros. Co.,** with headquarters in Gastonia, N. C. **John H. Headapohl** joined the firm as sales engineer specializing in automatic welding.

C. A. Murchison was made industrial sales manager of **Armstrong Furnace Co.,** Columbus, O.

K. C. Carnes was elected vice president of **Toledo Engineering Co.,** Toledo, O.

A. F. Scarr was appointed assistant to the vice president and general manager of **Kaiser Steel Corp.,** Oakland, Calif. He replaces **Jack J. Carlson.**

John D. Sutherland fills the new position of assistant division superintendent of steel producing at the Fairless, Pa., works of **U. S. Steel Corp.**

J. B. Klassen was made general manager, La Porte, Ind., works, **Allis-Chalmers Mfg. Co.**

Daniel J. Girardi was appointed metallurgical engineer in charge of research and process control at **Timken Roller Bearing Co.,** Canton, O.

Earl M. Douglas, formerly vice president-manufacturing of Studebaker-Packard Corp., was named vice president of **Dana Corp.,** Toledo, O., with responsibilities over technical activities related to product engineering.

Tom Barrett was made assistant sales manager, **Wisconsin Motor Corp.,** Milwaukee.

Howard W. Geyer was made first-shift superintendent and **Joseph M. Stana** second-shift superintendent at **Warner & Swasey Co.,** Cleveland.

Robert G. McCoy was named plant industrial engineer of the Ferndale, Mich., plant of **Republic Steel Corp.'s** steel and tubes division. He succeeds **William J. Nelson,** now methods engineer at the general office of the corporation at Cleveland. Mr. McCoy is now on special assignment to the Truscon Steel Division, Youngstown.

Chris J. Witting was appointed general manager of consumer products for **Westinghouse Electric Corp.,** Pittsburgh. He succeeds **John M. McKibbin** who joins the staff of **John K. Hodnette,** vice president-general manager.

R. J. Sargent was made general manager of **Westinghouse Electric Corp.'s** new major appliance division. He continues headquarters at Mansfield, O.

W. M. Hawkins was named Los

ANOTHER EXAMPLE of
REDUCING COSTS WITH—

Buhr ECONOMATION

Mills, core-drills, drills, countersinks and individual-lead-screw taps 206 intake manifolds an hour gross!

Economy and auto*mation* are combined in this Special to form another example of the way Buhr *Economation* reduces production costs for leading manufacturers.

This 6-way dial-type hydraulic-feed Buhr Special is equipped with a 72″-diameter 8-position automatic index table, complete with shot bolt.

Chip disposal is accomplished by an automatic rotating chip conveyor, attached to index.

Operations formerly accomplished by eight machines were combined in this Buhr Special —and volume of production was increased! . . . A typical example of Buhr Economation!

Buhr
MULTIPLE-SPINDLE
HIGH PRODUCTION MACHINERY

See what Buhr Economation can do to reduce your production costs. A phone call, wire or letter will bring you a prompt consultation with one of our top sales executives.

BUHR MACHINE TOOL CO.©
ANN ARBOR, MICHIGAN

Solidly Engineered • Precision Built • for World's Leading Manufacturers

Angeles district manager for **Consolidated Engineering Corp.**

Donnell W. Newman was made Chicago district sales manager, **U. S. Steel Supply Division, U. S. Steel Corp.**

W. S. Long was made vice president-operations at **Calstrip Steel Corp.**, Los Angeles.

Edmund L. Fitch was made sales promotion manager for **Howe Scale Co. Inc.**, Rutland, Vt.

F. Kenwood Jones succeeds **Howard P. Chace**, retired, as chief sales engineer of **Norton Co.'s** grinding machine division.

Robert W. Bruins fills the new post of manager of handler sales for **Colson Corp.**, Elyria, O. He was general manager of Gilbert Mann Co.

Bruce D. Henderson was named operating vice president and division manager in charge of the air conditioning division of **Westinghouse Electric Corp.** at Staunton, Va. **John A. Gilbreath**, who has been manager of the plant, is now manager of the division's packaged products department, a new position. Mr. Henderson succeeds **H. E. Seim**, Westinghouse vice president in charge of both the air conditioning and the Sturtevant Divisions. Mr. Seim will devote full time to operations of the Sturtevant Division at Boston.

John K. Segrave was made branch manager of the new Houston warehouse of **Rolled Steel Products**, division of Emergency Steel Service Corp.

Philip W. Scott was named assistant to the president of **Bryon Jackson Division**, Los Angeles, Borg-Warner Corp.

CARL F. SCHULTZ
. . . *Motor Wheel Corp. v. p.*

Carl F. Schultz was elected vice president-automotive sales of **Motor Wheel Corp.**, Lansing, Mich., to succeed the late **C. S. Holden.** Mr. Schultz was sales manager, pressed steel division.

A. J. Allcock Jr. was made chief staff engineer of **Sterling Electric Motors Inc.**, Los Angeles.

J. William Kelly heads electric truck sales for **Clark Equipment Co.**, Battle Creek, Mich.

C. H. Wheeler Mfg. Co., Philadelphia, formed an atomic energy division. **Belden S. Tucker**, former general sales manager, economy pumps division, was made sales manager for the new division.

Dick A. Miller was named plant superintendent, **Bassick - Sack Division**, Winston-Salem, N. C., Bassick Co., subsidiary of Stewart-Warner Corp.

Clement N. Williams was made assistant sales manager, **Lewis-Shepard Products Inc.**, Watertown, Mass. He was with Clark Equipment Co., for the last five years New England sales manager.

Michigan Chemical Corp., St. Louis, Mich., appointed **Dr. Dwight Williams** director of research.

Donald V. Sarbach fills the new post of research director of **Hewitt-Robins Inc.**, Stamford, Conn.

George J. Groya was made service manager, **Delta Power Tool Division**, Rockwell Mfg. Co. He has headquarters in Pittsburgh. He was Chicago district sales manager.

Fred S. Haas was named director of product engineering of **National Automatic Tool Co.**, Richmond, Ind. For the last 30 years Mr. Haas has been with Cincinnati Milling Machine Co.

T. H. Bartholomew was named manager, procurement department, tar products division of **Koppers Co. Inc.**, Pittsburgh. Formerly contract manager for the department, he replaces **H. B. Cummings** who was named assistant manager, marketing department sales.

W. M. Champion was made district manager of **Air Reduction Sales Co.'s** Shreveport, La., sales office. He replaces **John Lund** who has left the company.

Andrew F. Hillhouse was named manager of **Solar Aircraft Co.'s** Washington office to replace **John H. Baker**, resigned.

Wilfred A. Smith was named manager of new products sales for **B. F. Goodrich Co.'s** industrial products division, Akron.

Morton L. Zalk, formerly with Duluth Iron & Metal Co., is now associated with **Hyman - Michaels Co.** as St. Louis district manager. He is located at Alton, Ill.

OBITUARIES . . .

John J. Hyland, 51, founder and chairman of **Control Instrument Co. Inc.**, Brooklyn, N. Y., died Nov. 11.

Willard W. Oliver, 67, a retired vice president of **W. A. Case Co.**, Buffalo, died Nov. 5 in Charlottesville, Va.

Robert T. Lapham, 66, partner in **Lapham-Hickey Co.**, Chicago, died Nov. 13.

J. Carl Bode, 53, president of **National Carbide Co.**, a division of Air Reduction Co. Inc., New York, died Nov. 11.

Karl M. Lyons, 66, director of sales for the container division of **Jones & Laughlin Steel Corp.**, New York, died Nov. 13.

Max Schott, 79, a director and former president of **Climax Molybdenum Co.**, died recently.

Anthony M. Gabriel, 60, owner of **Hillside Tool & Die Co.**, Hillside, N. J., died Nov. 8.

FACING A TOUGH PROPOSITION?

you can beat it with *JALLOY*

Only a seasoned hunter with the right equipment can stand up to a charging rhino. And, likewise, only a special steel like JALLOY can withstand severe impact and abrasion . . . day after day. In comparison with mild steels as well as other abrasion-resistant steels, JALLOY gives outstanding results when heat-treated to your specifications.

This modern heat-treated plate brings savings in steel costs, maintenance, and repair, and also is easily welded. JALLOY is available in three grades, each of which is designed for specific applications.

J&L STEEL

Complete data concerning CHEMICAL COMPOSITION . . . HEAT TREATMENT . . . WELDABILITY . . . PHYSICAL PROPERTIES . . . will be mailed to you promptly. Write today.

Jones & Laughlin
STEEL CORPORATION – *Pittsburgh*

Jalloy Plates outlast other steels by margins of 4 to 1

Jalloy lowers maintenance costs on ore and coal conveyors

Jalloy provides longer wear with less repair in truck bodies

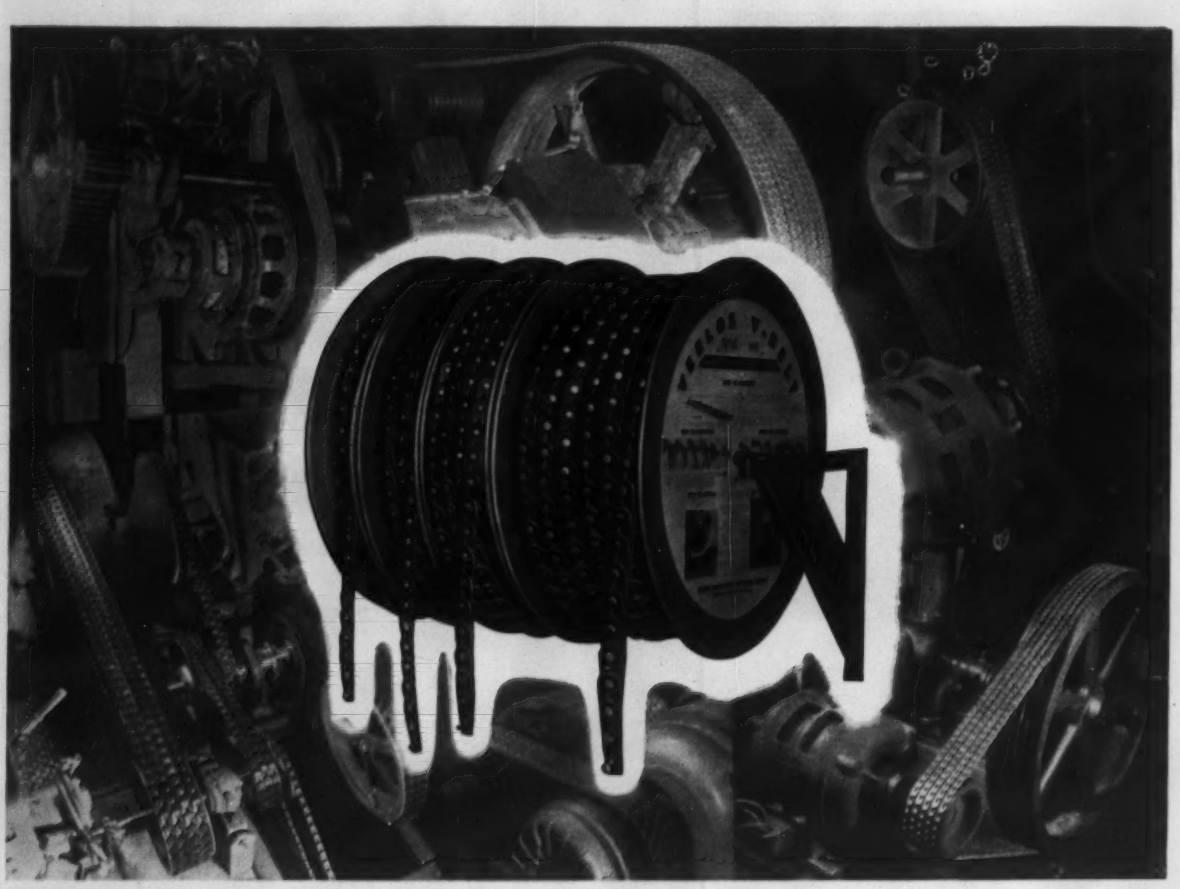
Jalloy Aprons in Tyrack screen last 3 times as long as other steels

Jalloy heat-treated steel plate beats wear due to impact and abrasion

Jones & Laughlin Steel Corporation
3 Gateway Center, Dept. 404, Pittsburgh 30, Pa.

☐ Please mail complete data concerning Jalloy.
☐ Please have your representative call.

Name _____
Title _____
Company _____
Address _____
City _____ Zone ____ State _____



THIS *one* V-BELT INVENTORY

keeps your drives on the go

Take a look at the illustration above—there's a *complete* v-belt inventory. Those four 100-foot reels of Veelos—the adjustable v-belt—in the O, A, B and C widths can replace up to 316 different sizes of endless v-belt. Of course, when you use only one or two widths of v-belt, you stock reels of only those widths. This 4-reel Veelos v-belt inventory is easy to maintain, stores in a space only 16 inches square, and is ready when you want it.

But inventory saving is just a part of the Veelos story.

Veelos adjustable v-belt is *easier to install*—in many cases installation is completed in 50% to 90% less time.

Using Veelos means you don't have to re-set motors or remove outboard bearings. Veelos v-belts provide *vibrationless, full power delivery.* A demonstration on an electronic vibration analyzer will show you and prove to you that Veelos v-belts *reduce vibration up to 90%!*

Switch to Veelos adjustable v-belt—the one v-belt that keeps your drives on the go. See your Veelos distributor. Write for your copy of the facts-packed Veelos Data Book.

MANHEIM MANUFACTURING & BELTING COMPANY
613 Manbel Street, Manheim, Penna.

VEELOS
THE BALANCED
LINK V-BELT

ADJUSTABLE TO ANY LENGTH • ADAPTABLE TO ANY DRIVE

Veelos is packaged on reels in 100-foot lengths. Sales engineers in principal cities; over 350 distributors throughout the country. VEELOS is known as VEELINK outside the United States.

Benton Harbor foundry installs electric furnace as . . .

Castings Demand Gains

INSTALLATION of an 8-ton electric furnace opens a new industrial phase at Superior Steel & Malleable Castings Co., Benton Harbor, Mich. It will enable the plant to double its production, says Ross L. Gilmore, president.

The new furnace, made by Whiting Corp., Harvey, Ill., gives the company two electric units and one open-hearth furnace. Total installation cost was $100,000.

Up to 15 Tons—Before the new furnace was put into operation, the Steel Foundry Division had equipment and tools to produce 700 tons of castings (which range from 1 ounce to 30,000 lb) per month.

It takes one and one-half hours to charge and melt a heat. With the plant operating on two 8-hour shifts, this means the process is repeated ten times daily.

Besides the large amount of electricity required to operate the furnace, the company uses 10,000 gallons of water daily to keep the parts of both electrical units cooled.

The furnace was installed by Pearson Construction Co. in near-record time. It took only three months to get the unit in operation. Normally, it takes eight or nine months.

As the plant continues to expand, it's possible still another furnace may have to be added. But it won't be for at least two or three years, Mr. Gilmore says.

Detroit Harvester Buys Firm

Detroit Harvester Co. purchased Peters-Dalton Co., both of Detroit, producer of spray booths, washers and ovens for the automotive and other metalworking industries. This is part of a long-range expansion and diversification program of Detroit Harvester, producer of automotive parts and equipment, power lawn mowers and farm mowers.

Frasse Installs Huge Saw

Peter A. Frasse & Co. Inc., New York, has installed an abrasive saw that promises to accelerate greatly the cutting of heavy stainless steel and aluminum plate. The machine is 24 ft long and is capable of cutting plate up to 240 ft long. Frasse has expanded its stocks of stainless steel plate.

Hunter Builds Aluminum Mill

Hunter Douglas Corp., Riverside, Calif., is building a $5-million aluminum processing plant at Flemington, N. J. The plant will double the firm's productive capacity and marks its first direct entrance into eastern markets. Continuous machinery, developed by Hunter Douglas, casts aluminum alloy into bars and then into strip.

Liquidates Stamping Plant

Knickerbocker stamping plant, Parkersburg, W. Va., has been sold to Broughton Dairy Inc., Marietta, O., and will be used for food processing. The equipment, including presses, shears and press brakes, will be sold by Hetz Auction Sales Inc., Warren, O., Dec. 6.

Oster Enters New Field

Oster Mfg. Co., Cleveland, is entering the material handling equipment field. The company, well known for its line of pipe and bolt threading machines, will market next year on an international basis a line of multipurpose, hand-propelled, hand and battery-operated portable lifts with capacities up to 2000 lb.

Le Roi Opens Branch Plant

Westinghouse Air Brake Co.'s Le Roi Division, Milwaukee, established a branch plant at 5000 45th West Ave., Tulsa, Okla. Le Roi makes internal combustion engines, air compressors and air tools for the construction and mining industries.

Parker-Kalon To Move

General American Transportation Corp.'s Parker-Kalon Division, maker of self-tapping screws, is moving into its new 267,000-sq-ft plant in Clifton, N. J. Facilities will provide a 25 per cent increase in capacity.

Ohio Moulding Changes Hands

Ohio Moulding Corp., a newly organized firm, purchased Ohio Moulding Co., maker of roll formed metal shapes. Officers of the new firm include: Alex Miller, chairman of the board; Fletcher Gleason, president and treasurer; Lewis Miller, executive vice president; Harry Reznick, secretary. The company plans to enlarge the business, including the purchase of additional equipment and expan-

sion of its plants in Cleveland and Wickliffe, O.

Kaiser Orders Rolling Mill

Kaiser Aluminum & Chemical Corp., Oakland, Calif., awarded a contract for an aluminum hot-rolling mill installation for the Ravenswood, W. Va., Works to Loewy-Hydropress Rolling Mill Division, Baldwin - Lima - Hamilton Corp., New York.

Wesson Opens Canadian Plant

Wesson Co., Detroit, producer of cemented carbide metal cutting tools, is expanding its Canadian operations with the opening of a new division, Wesson Cutting Tools Ltd., Toronto, Ont. The division will be headed by H. B. Iron, president, and L. P. Chapman, vice president in charge of sales. Initially, manufacturing operations will consist of standard and special single-point tool fabrication.

Wire & Cable Firm To Move

Ansonia Wire & Cable Co., Ansonia, Conn., will move to Cumberland, R. I., occupying a 120,000-sq-ft plant to be completed next spring by Rhode Island Business Development Co. at a cost of $1 million.

J&L Builds in Tulsa, Okla.

Jones & Laughlin Steel Corp., Pittsburgh, is building a $1.5-million headquarters building at Tulsa, Okla., for its Supply Division. It will contain more than 100,000 sq ft of floor space and will be ready for occupancy in September, 1956.

Kewanee-Ross Corp. Dissolved

American Radiator & Standard Sanitary Corp., New York, dissolved its wholly owned subsidiary, Kewanee-Ross Corp. The corporation formed two divisions to continue Kewanee-Ross operations. The Kewanee Boiler Division is headed by W. B. Russell, president, and E. M. Palmer, executive vice president. Ross Heat Exchanger Division is headed by J. C. Linsenmeyer, president, and R. S. Reade, executive vice president.

Operator Gets Lift

This traveling coal unloading tower is unique in that it has a built-in elevator for maintenance and operating personnel. Built by Mead-Morrison Division, McKiernan-Terry Corp., the 136-ft-high tower is equipped with a 10-ton-capacity grab bucket, has a free-digging rate of 850 tons per hour and has a 150-ton receiving hopper

Kelsey-Hayes Completes Merger

Kelsey-Hayes Wheel Co., Detroit, merged with Steel Products Engineering Co., Springfield, O., maker of aircraft parts and ordnance equipment, as well as other precision equipment and machine tools.

Buys Detroit Sintered Metals

Bunting Brass & Bronze Co., Toledo, O., purchased Detroit Sintered Metals Corp., Detroit, manufacturer of bearings and parts made of powdered metals. The new property will be operated as a wholly owned subsidiary. Detroit Sintered Metals is building a plant at Kalamazoo, Mich., to increase production.

Hubbell Metals Opens Branch

Hubbell Metals Inc., St. Louis, opened a plant at 484 S. Front St., Memphis, Tenn. It will carry stocks of steel (including stainless), brass, copper, magnesium, aluminum, fasteners, fittings, valves and accessories. It will provide shearing and cutting service. Howard Broemmelsick is manager.

Hallden Boosts Plant Capacity

Hallden Machine Co., Thomaston, Conn., completed an addition to its factory which increases manufacturing floor space by about 60 per cent and allows for expansion of office quarters. The firm makes automatic guillotine and rotary-type shears and straightening equipment for sheet and wire.

Etna Machine Builds Plant

Etna Machine Co., Toledo, O., manufacturer of heavy-duty tube mills, tube cut-off machines, swaging machines and allied equipment, is erecting a plant near Perrysburg, O. Estimated cost is $300,000.

U. S. Industries Buys Firm

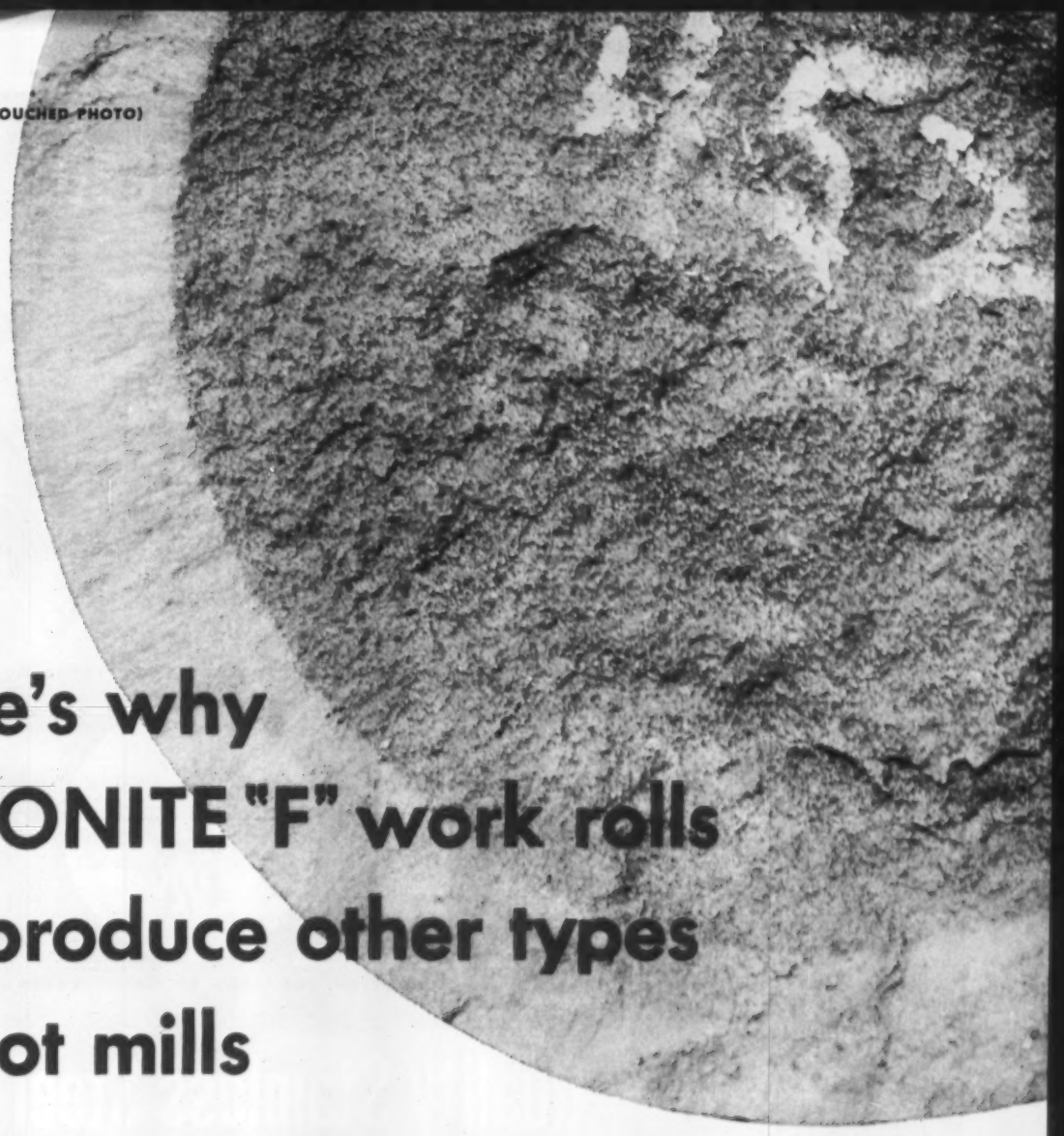
U. S. Industries Inc., New York, purchased Southern Pipe & Casing Co., maker of steel pipe for the transmission of water, oil and gas. The plant is near Azusa, Calif. U. S. Industries recently purchased Garrett Oil Tools Inc., Longview, Tex.

Erie Selects Repair Shop Site

The Erie Railroad will build a $2-million freight car repair shop at Meadville, Pa., to replace the one at Dunmore, Pa., which was destroyed by flood waters following Hurricane Diane.

Ships Nonreturnable Reels

Anaconda Wire & Cable Co., New York, has adopted a program of making shipments of certain types of wire and cable on nonreturnable reels. Initially, the program will be restricted generally to shipments of building wire items to distributors' stocks and to aluminum insulated and covered conductors. Customer benefits: Elimination of reel deposit charges, clerical records for the maintenance of reel data and reel returns to the manufacturer; reduction of storage space and in over-all weight.



(ACTUAL UNRETOUCHED PHOTO)

Here's why NIRONITE "F" work rolls outproduce other types in hot mills

Take a look at the close grain structure and deep shell of this test-fractured 21" diameter Mack-Hemp Nironite "F" work roll. You can actually *see* why Nironite "F" rolls give you greater tonnages between regrinds . . . why they offer greater resistance to banding... why they last all the way to worn-out diameter. So distinctive is this close grain structure that mill operators report that they can recognize Nironite "F" rolls by the continued good roll surface even after long use — whether or not they have seen the stripes on the wabblers.

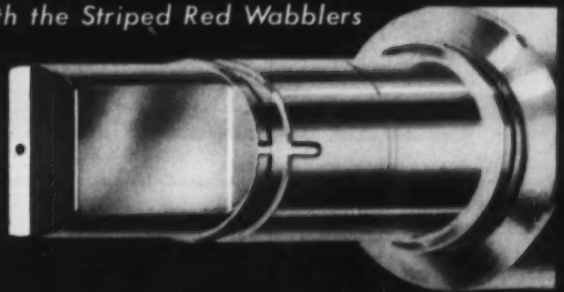
Nironite "F" rolls are high-nickel, high-chromium alloy grain type, double poured for maximum strength. They can be supplied in any desired hardness from 65 to 85 Shore scleroscope (C Scale).

Mack-Hemp offers an entire series of Nironite nickel-chromium cast iron alloys for 2-high or 4-high hot mill roughing, intermediate and finishing rolls. Your Mack-Hemp sales engineer will be glad to give you assistance in choosing exactly the right type and hardness for your particular rolling problem.

MACKINTOSH-HEMPHILL
DIVISION OF
E. W. BLISS COMPANY
Pittsburgh and Midland, Pa.

cast mill rolls • Johnston cinder pots
rotary tube straighteners
heavy-duty lathes • end-thrust bearings
steel and special alloy castings

You get more tonnage from the rolls with the Striped Red Wabblers



Get the service you need!

Call Rotary

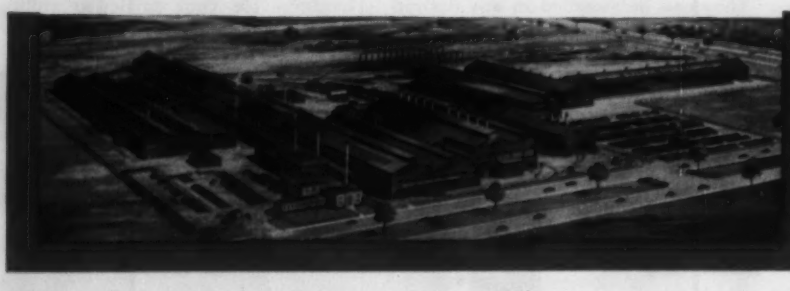
Hot Rolled
Cold Finished

Quality Stainless Steel Bars

STAINLESS BILLETS FOR FORGING IN COMPLETE SIZE RANGES

Rotary Electric Steel Co.

P. O. BOX 4606 • DETROIT 34, MICHIGAN



ALLOY and STAINLESS STEELS
BILLETS • SLABS
HOT ROLLED and COLD FINISHED BARS

SALES OFFICES—Chicago • Cleveland • Newark, N. J. • Hartford, Conn.

SALES AGENTS—Indianapolis • Fayetteville, N. Y. • Houston, Texas

STEEL

November 28, 1955

Technical Outlook

ALUMINUM CHAIN—Electrically welded by automatic equipment, it's being made for the first time in sizes ranging from ¼ through ½-in. by McKay Co., Pittsburgh. Size for size, its load limit is about 60 per cent that of steel chain; it weighs 65 per cent less, is nonsparking, nonmagnetic and has good corrosion resistance. Chiefly for decoration now, aluminum chain is a natural for outdoor use—fences, railings, marine and architectural applications. Industrial uses are developing, too.

PHOTO METAL—Anodized aluminum with emulsion embedded in the surface pores makes a photographic printing plate with superior wear resistance. Under the name Metalphoto, it is being used for name plates, badges, signs, slide rules, charts and drawings that get rough handling, instrument dials and similar items. It gives a jet black image against an aluminum background which can be colored by staining.

METALLIZED SANDWICH— A thrust collar for a hydroelectric unit was repaired by spraying 0.003-in. of molybdenum onto the surface before 0.25-in. of steel was applied. Result: A sprayed sandwich. The molybdenum layer served as a bond. Surface preparation involved boring the collar true, cutting eight V-threads per inch on the ID, then roughing with a rotary-shaft preparing tool.

SMALLER BUT STRONGER—Remove the right amount of material from the shank of a bolt and you will increase its impact strength several times, Oran A. Pringle, University of Missouri, told the ASME at Chicago. The method is used to strengthen bolted joints against shock loads. Reduced shock permits more elongation during tightening. Resistance to fatigue is better. Prof. Pringle said the method is valuable in construction of combustion engines, railroad car carriages, rock crushers and other machinery where parts bear sudden and repeated shock loads.

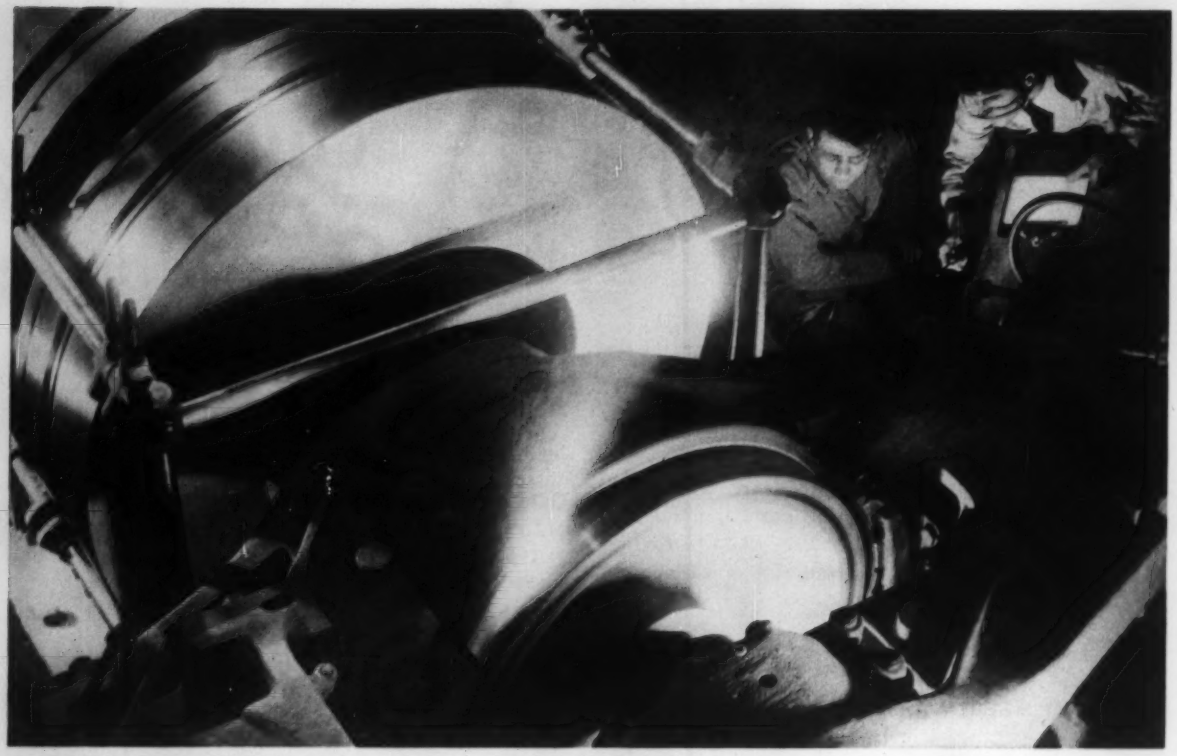
LOOK AHEAD—A prediction made at the annual meeting of the Porcelain Enamel Institute: By 1960 every house built in this country costing less than $15,000 will be built with prefabricated parts. Many will be steel, colored with porcelain enamel for color fastness and freedom from maintenance.

EPOXY STICKS—Sterling Grinding Wheel Co., Tiffin, O. is using an Epoxy-resin-based adhesive to cement an aluminum insert to a vitrified wheel used for valve seat grinding. Advantages: High bond strength under heavy loads, no warpage.

LIQUID METAL COOLED—The Consumers Public Power District of Nebraska has a proposal before the AEC to build a sodium-cooled, graphite-moderated, nuclear power plant to turn out 75,000 kw. It is to be completed in 1959. Design phases will be carried out by North American Aviation Inc.

SAVE ON START-UP—We can save $½-million a year by using natural gas to light up our open-hearth furnaces after rebuilding, says George Grosvenor, open-hearth superintendent, Colorado Fuel & Iron Corp. He told the Chicago regional technical meeting of the American Iron & Steel Institute that savings come from: 1. Less time needed to light up furnaces. (In this 16-furnace shop, furnace time is worth $150 an hour.) 2. More production. Furnaces are turning out their maximum after the second heat. 3. Better roof life. 4. Lower fuel costs.

Metalworking Outlook—p. 59 *Market Outlook—p. 135*



Wear testing at the American Brake Shoe Co. research laboratory

War on Wear

By VAN CALDWELL
Associate Editor

Wear is a fact of life. Nobody seriously considers getting along without it. The problem is to get along with it

LIVING in the midst of wear, we are inclined to regard it like the weather. But unlike the weather, we are doing something about it.

Because it takes so many forms, wear is hard to pin down.

It is a slow process (usually).

It is characterized by removal of material, resulting in dimensional changes (but not always).

It is unintentional (unless we put it to use, as in wear-in).

It results from pressure and contact of two bodies (but vibration, heat and corrosion can also enter the picture, and one body can be liquid or gaseous).

For all its familiarity, wear is something we don't know much about. Fortunately, we have some guides to follow in fighting it.

Identify — One of the first precepts of war is: Identify the enemy—a good lead to follow when fighting wear. You can recognize the forces as impact, friction (adhesion), abrasion, vibration, heat, corrosion and pressure.

Though they are always found working in combination, certain forces will stand out. Adhesive-abrasive wear is so common in machines that it is usually what we have in mind when we say "mechanical wear." But there are other possibilities. For example, in an automobile, corrosion can be the dominant factor in top cylinder wear, with abrasion standing out in the area of ring travel.

Tests — Sometimes wear is as plain as the gouges on a bulldozer blade. All too often wear is hidden, and due to a combination of circumstances. In such cases, wear tests may help identify the causes and determine their relative importance.

Nobody agrees on a good wear test. Service testing is usually too slow and too costly. Tests that simulate service end up by exaggerating for the sake of a fast answer. Providing you recognize the limitations and are careful about extrapolating data from

one wear situation to another, testing can be a big help.

Plan of Attack—There's a second precept of war that holds for wear: Divide and conquer. It's a lot easier to fight wear when the causes can be separated and neutralized separately.

The countermeasures break down into four general types: 1. Change the environment. 2. Provide a barrier. 3. Change the material. 4. Change the design.

Environment—A shaft that operates in a corrosive atmosphere has two strikes against it. Besides the frictional stresses imposed on it by load and motion, it has to contend with chemical attack. If ventilation or sealing can put a clean atmosphere around the shaft, the frictional problem stands isolated and easier to solve.

Air conditioning (including heating, cooling, drying, humidifying, cleaning) isn't the only way to change the environment. Measures to stop vibration may be just as important. Of course, there are plenty of times when nothing can be done to change wear conditions. A barrier is called for.

Interpose — Leonardo da Vinci had the right idea when he wrote: "All things and everything whatsoever, however thin it may be, which is interposed in the middle between objects that rub together lighten the difficulty of this friction." Today, we assign this role to lubrication.

A lubrication engineer, touring the recent Machine Tool Show, asked: "Where do you put the oil?" Oil cups, buried sumps and hidden ports were sometimes as out of date as the rest of the machine was modern.

His headshaking comment: "If they would only call in lubrication engineers when they design these machines, think of the grief we could save them." It's worth remembering that lubrication is as much a part of design as mechanism.

No Dirt—To be of full value, lubrication demands cleanliness. Filters, seals and covers are as much a part of the lubrication picture as oils and greases. There's a lot of truth in the complaint of Chrysler's wear expert, W. E. Jominy: "I wish there were more profit in servicing the air cleaner."

Lubricants are triple-threat wear preventers. They make a cushion, flush away grit and act as heat-exchange mediums. They fail to prevent wear when pressure and friction combine to wipe clean the high points of adjacent surfaces so that they weld together.

What's Ahead—The best lubricants won't prevent some weld-and-break contact, but the ideal toward which engineers are working is perfect hydrodynamic lubrication in which an unbroken liquid film carries the load. We can, in effect, hasten that day by super-

For Wear Resistance, Change the Surface

Technique	Applicable to	Effect	Protects against
Electroplating Chromium Nickel	Most ferrous and nonferrous materials	Hard, smooth, usually thin, surface layer. Degree of porosity can be controlled	Heat, corrosion, abrasion
Anodizing	Aluminum, magnesium, zinc	Hard, thin oxide layer	Heat, corrosion, friction, abrasion
Diffusion (impregnation) Carburizing Carbonitriding Cyaniding	Steel only (usually low carbon steel)	High carbon or high nitride (or both) case; surface hardness	Friction, abrasion
Nitriding	Steel containing nitride forming elements	Hard nitride case	Friction, impact, corrosion, vibration
Chromizing	Iron and steel, nickel, cobalt, molybdenum	Stainless steel case	Corrosion, heat, friction
Siliconizing	Iron and steel	Iron-silicon alloy case	Friction, corrosion, heat, impact
Aluminizing	Iron and steel	Iron-aluminum alloy case	Heat, corrosion
Spraying Metallizing Ceramic spraying Flame plating	Metallic and nonmetallic base materials	Layer of interlocked particles, usually part oxidized, and porous	Friction, heat, corrosion, abrasion, depending on material sprayed
Hard facing Gas welding Arc welding	Ferrous and nonferrous metals	Heavy alloy or carbide layer with properties depending on the material deposited	Impact, heat, corrosion, abrasion, friction, vibration, depending on material deposited
Chill casting	Gray iron, some steels	White iron surface	Abrasion, impact
Surface hardening by flame or induction	Iron and steel	Local surface hardness, depending on area heated, time, temperature, quench and material	Abrasion, friction, vibration, impact

War on Wear: Divide and Conquer

Type of wear	Probable cause	Preventive Measures
Erosion Scratching Grinding Gouging	Abrasion	Air cleaners; oil filters; dust covers; seals; lubricants to flush away grit; tough malleable materials; ductile bearing materials; parts designed for economical replacement
Smoothing Seizing Galling Scuffing	Friction (Adhesion)	Better hydrostatic lubricants; self-lubricating materials; better methods of lubricant application; lighter loading; fine surface finish; coatings; surface films and controlled wear-in
Deformation Cracking Cavitation Flaking	Impact	Hard case-tough core materials achieved through heat treatment, cold working, hard surfacing; shock absorbing devices
Fatigue Cracking Fretting	Vibration	Changes in amplitude and frequency of vibration; dampers; elimination of stress raisers such as notches and sharp angles; cold-worked surfaces; changes in pressure
Solution Scaling Pitting Oxidizing	Corrosion	Detergent lubricants; moisture control; materials and surfaces exhibiting low chemical activity; electrically compatible materials
Creep Softening Scaling Crazing Growth Cracking	Heat	Cooling systems for lubricants and atmosphere; materials that are excellent heat conductors or reflectors; lower unit pressures; materials with high hot strength

finishing or lapping mating surfaces, or by careful run-in.

A considerable amount of wear prevention is going to come from improved methods for applying lubricants. Spray methods are gaining in popularity. A General Motors wear expert thinks we ought to spray gears as they come *out* of mesh. Advantages: Quick flushing of surface heat from the teeth and removal of excess lubricant (and the resulting pressure build-up between teeth) by centrifugal force.

Self-Lubrication—Much is to be expected, too, from materials that have some properties of self-lubrication: Gray iron, plastics like Nylon and Teflon and oil-impregnated powder metal products.

One example: The Navy reports a film of Teflon, originally applied to small arms as a corrosion barrier, confers long-lasting frictional protection. It acts as a dry lubricant for low loads and moderate speeds.

Material—When nothing can be done to improve environment or lubrication, then it's time to think about changing the wearing material. A Royal Dutch Shell engineer suggests a philosophy for picking something better: 1. Convert destructive to permissible wear. 2. Divert the direction of attack. 3. Protect the surface.

A metal which wears in to a low-friction finish, or one, like aluminum, that corrodes to form a wear-resistant surface film are examples of No. 1. Sleeve and split bearings are examples of No. 2. Wear is shifted to a material that can be economically replaced. Surface protection, No. 3, offers by far the widest range of choice. It is also the area where changes are coming fastest.

Surface—The fact that we can change the wear pattern by changing materials seems to imply that wear resistance is an innate property of materials. Not so, say the experts. Conditions of service are everything; the material that serves perfectly in one application can fail miserably in another. For certain types of wear, however, it is possible to build up order-of-merit lists as a guide (right).

Such a list would apply whether a material is used for hard-facing or for the basic structure. When considering surface protection, the choice is between materials which accept surface treatments differently, and between types of treatments. For an idea of the possibilities, see the charts.

Eyes Open—Each new development in machines, transportation and atomic energy creates wear situations that seem beyond immediate solution, yet frequently the answers lie in materials and methods available and waiting to be tried.

How well are you keeping up with what is new in the wear resistance picture? Here are some recent developments.

Aluminum coatings: Dipping processes (Aldip, Alumicoat) give carbon steel and other base materials an aluminum coating which increases hot wear resistance many-fold. They are being used on automobile valves and exhaust manifolds.

Flame plating: Tungsten carbide coatings are applied on a wide variety of materials by shooting molten carbide powder from a "gun" with explosive force.

Organic coatings: Some of the newer ones are good enough to give substantial abrasion resist-

ance to vacuum metallized coatings. Vacuum metallizing becomes useful for such applications as hardware finishing.

Metal spraying: The familiar technique has been extended to the spraying of nonmetallics, such as aluminum oxide.

Vapor plating: Sometimes called gas plating, it's a technique adaptable for depositing a wide range of coatings (metallic and nonmetallic) on an equally large range of base materials. Coatings can be thick or thin.

Porous chromium: Etching processes give chromium plate a pinpoint or channel-type porosity which adds oil-holding ability to the natural wear resistance of chromium.

Uncommon coatings: For wear resistance under highly corrosive atmospheres or at high temperatures look to coating materials too expensive for routine use. Coatings of cobalt, tungsten, boron, tantalum and vanadium can be produced by electrodeposition, cementation or vapor plating.

Hard chrome and nickel: As plated coatings, they are being increasingly used for protection of parts subject to high wear such as rolls.

Strippable coatings: Polyvinyls, acetates and butyrates, usually applied by dipping, are giving metal parts impact and scratch protection as well as corrosion resistance during handling and storage.

Electropolishing: It can greatly reduce microroughness (from a lapped 4 micron rms surface to 0.3 microns rms, for example), to reduce metal-to-metal friction.

Sherardizing: This old-time batch method for producing abrasion-resistant zinc coatings by cementation has been improved by the addition of large quantities of alumina to the zinc dust used in the process.

Vitreous enamels: Virtually unused for wear resistance, they have properties which offer interesting wear possibilities.

Upgraded babbitt: Look for new high speed alloys with the structural characteristics of babbitt. They are getting a tryout as ball retainers in high-speed aircraft bearings.

Sulphur case: A recent French development uses a salt bath to penetrate steel surfaces with sulphur compounds. It's supposed to impart good high-temperature wear qualities.

Solid lubricants: Graphite and molybdenum sulphides incorporated in a resin base and baked on the surface of small parts give excellent protection against wear from oscillating motion. One present use: Seat slides in aircraft.

Sea of air: When electric motor brushes in World War II aircraft failed catastrophically at high altitude, a lot of people were surprised to learn that dryness was the culprit. Look for new revelations on the important role of water vapor in wear resistance.

Extremes: One company has gone to opposite ends of the hardness range — alumina against graphite—for rotating seals.

Bearings: Aluminum is the metal to watch for turbine and internal combustion engine bearings. Lower leaded bronzes are also showing promise for better service at higher temperatures and with problem-creating synthetic lubricants.

Nature of the beast: There's a world of room for improvement—and it's coming—in basic wear theory. A recent GM contribution relates bearing qualities to difference in atom sizes. A good bearing has atoms enough bigger or smaller than the journal atoms so that few atomic junctions can be formed.

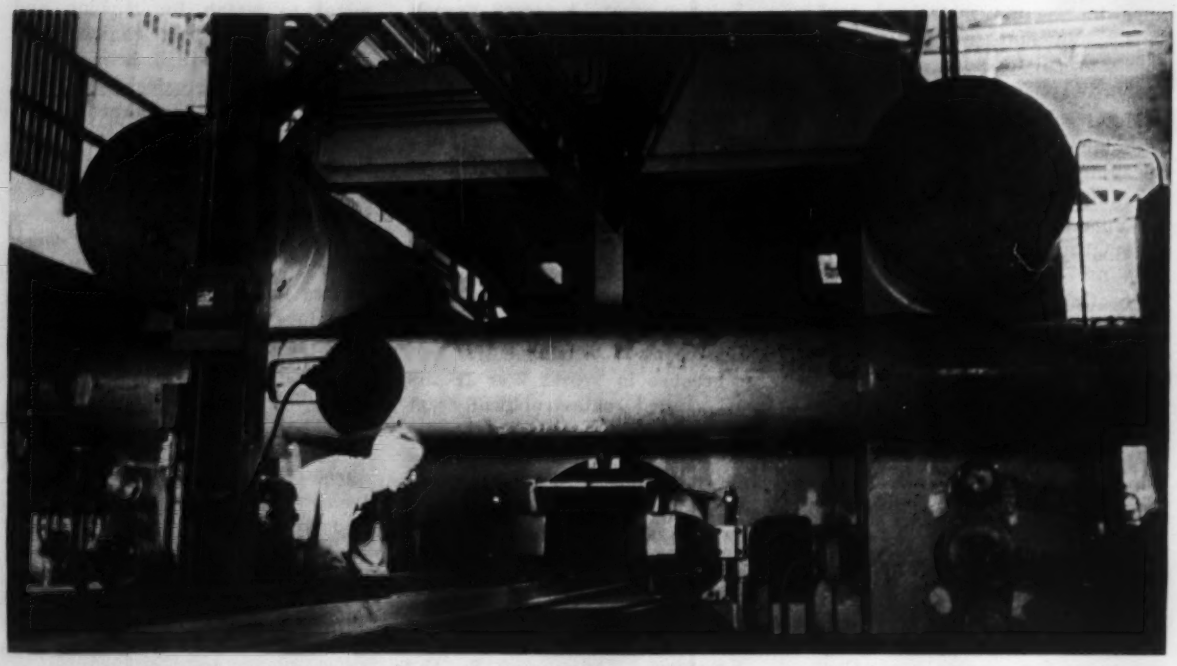
Wear words: When people can agree on exactly what is meant by terms such as "galling," "fretting" and "scuffing" we'll be a lot closer to solving some basic wear problems.

• Extra copies of this article are available in quantities from one to three until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.

Alloys for Impact and Abrasion Resistance

Increasing abrasion resistance ↑	Tungsten carbide composites	Maximum abrasion resistance. Worn surfaces become rough
	High chromium irons	Excellent erosion resistance. Oxidation resistance
	Martensitic irons	Excellent abrasion resistance. High compressive strength
	Cobalt-base alloys	Oxidation resistance. Corrosion resistance. Hot strength and creep resistance
	Nickel-base alloys	Corrosion resistance. May have oxidation and creep resistance
	Martensitic steels	Good combination of abrasion and impact resistance. Good compressive strength
Increasing toughness ↓	Pearlitic steels	Inexpensive. Fair abrasion and impact resistance
	Austenitic steels	Work hardening
	Stainless steels	Corrosion resistance
	Manganese steel	Maximum toughness with fair abrasion resistance. Good metal-to-metal wear resistance under impact.

Source: American Brake Shoe Co.



End of the squeeze. An extrusion emerges on the runout table

Keeping Ahead of Extrusion

YOU RUN just to keep up in the aluminum extrusion business. The growth statistics of the industry (right) give the big picture. For the close-up view, see what's happening at Halethorpe, Md.

Kaiser Aluminum & Chemical Corp. has just completed a $25-million addition to its extrusion plant. It was financed by the Air Force and is operated under a five-year lease. Already under way is a $6.5-million second addition, scheduled for completion in December, 1956.

Rex and Regina—The plant addition went into production Nov. 2. Its first extrusion (a 14-ft wing section for the military) was squeezed out on an 8100-ton press.

The big press and its twin, dubbed Rex and Regina, stand side by side in the main bay of the 340,000-sq-ft plant. Their work was cut out for them long before they were installed.

One aircraft company wants 5-million lb of extrusions, but the Air Force has first priority for 1.5-million lb. With press capacity of up to 2-million lb a month (depending on section and alloy), Kaiser hopes that eventually it'll be able to work in some capacity for civilian products.

Busters—The twin presses, designed by Loewy-Hydropress, are 126 ft long, with 130-ft runout tables. Each weighs 1500 tons. They will handle billets up to 26 in. in diameter and 58 in. long. Finished extrusions will weigh up to 1400 lb.

Billets are preheated by induction, and temperature is maintained in the presses by resistance heaters with a range of 1500°F. Maximum speed of the stroke is 50 fpm at 24 cycles an hour (Kaiser plans to operate the presses at 15 to 20 cycles per hour).

The squeeze comes from three cylinders. The two main ones exert a load of 5400 tons and the central mandrel cylinder adds another 2700 tons of thrust. Some idea of the cost of the presses can be gathered from the $40,000 replacement cost of one tierod (each press has four, 76 ft long and 20½-in. in diameter).

What It Takes — To keep the presses in full production, there's a die shop, a laboratory for continuous testing and this production equipment:

Each of the four reverberatory furnaces has melting hearths with a capacity of 50,000 lb, and holding hearths with a capacity of 30,000 lb. These furnaces can melt 15,000 lb of metal every hour.

Two billet casters are capable of producing billets up to 25 ft long, with diameters ranging from 12 to 20 in. Each casting station can produce from two to four billets per operation, depending upon

their diameters.

Four car-type homogenizing furnaces, each with a capacity of 100,000 lb, are equipped with six log cars and one transfer car for loading and discharging.

Two billet saws and conveyors utilizing saw blades 48 in. in diameter are capable of cutting billets 20 in. in diameter in 35 seconds.

A billet coring machine has a range of 8 to 20 in. for inside diameters on billets with outside diameters of 15 to 29 in. It can handle billets between 15 and 52 in. in length and up to 3100 lb.

Six induction billet heaters have a capacity of 4000 lb per hour in billets from 12 to 20 in. in diameter and 60 in. long, heated to a temperature of 800°F.

A vertical heat treat furnace has a capacity of 10,000 lb per load and is capable of handling pieces up to 50 ft in length.

A horizontal roller hearth heat treat furnace has a capacity of 4000 lb per hour in a continuous process and is able to handle pieces up to 90 ft long. Quick quench is applied by nozzle sprays capable of emitting 25,000 to 30,000 gpm of water.

An age and anneal oven has a capacity of 100,000 lb at 800°F in 8 hours.

A roll straightening-roll contour correcting machine is capable of handling pieces up to 85 ft long.

A horizontal straightening gag press is capable of handling pieces from 30 in. to 85 ft long with diameters that can be inscribed within a 24-in. circle.

A hydraulic stretcher-detwister is capable of handling pieces up to 90 ft long with diameters that can be inscribed within a 24-in. circle.

A detwister capable of exerting 3-million inch pounds of pressure can handle pieces up to 85 ft long with diameters that can be inscribed within a 24-in. circle.

Power — The hydraulic system powering the presses has 14 bottles of 2400 gallon capacity (ten air, four air and water) and a suction tank with a capacity of 12,000 gallons. The system will operate both presses simultaneously on a 24-cycle-per-hour basis.

At peak production, the plant is expected to use 1.8-million kw-hr of electricity and 35-million cu ft of gas per month.

Plus—All this is in addition to Kaiser's older next-door plant, which houses one 4400-ton Southwark press, two 2500-ton Schloemann presses, one 1600-ton press and a 500-ton baby for experimental purposes. These presses have circular chambers, but the new presses are designed for rectangular chambers when they are needed.

Expansion planned for 1956 will add three 2750-ton presses and one 3500-ton tubing press. They are expected to jump extrusion capacity to about 6 million lb a month.

Watch Aluminum Extrusion Grow

	Number of extruders	Extruded shapes, tube blooms, tubing
1955	104	300,000 tons*
1954	93	256,650
1953		231,199
1952		173,771
1951		156,472
1950	30	129,038
1949	19	74,998
1948		85,972
1947	8	* estimated

Removing 7000-lb billet from casting station

This detwister will deliver up to 3-million inch pounds of pressure

MACHINE TOPICS

By R. F. HUBER, *Machine Tool Editor*

WHEN THE Department of Defense halted its layaway machine tool program, it did more than withdraw a hatful of machine tool business. It hinted that its basic thinking on preparedness has changed.

The original plan made good sense: Purchase long-lead-time machines so the services can throw modern equipment into production in an emergency. That's the kind of readiness the Vance Plan advocates.

Now, under the label of a Washington economy drive, it looks as if common sense is being questioned. The program will be held up indefinitely, pending review by top Pentagon officials. One stumbling block, they say: There have been such tremendous changes in weapons and machine tools that many machines bought now would be obsolete in a few years.

Choice — This, admittedly, is a whale of a problem to the services. There probably is no perfect solution. The question is: Is it better to buy now, risking that the equipment will be partially obsolete when it's needed? Or is it better to wait till it's needed and then buy?

Remember, they're talking about machines that take 18 months to build. In an emergency, 18 months may be too long. The choice is between *having* a partially obsolete machine, or having nothing but a signed order blank.

Despite Washington insistence that this isn't related to the Vance Plan, it's a good bet the same philosophy (or whatever it is called) will be applied to other reserve facilities.

Future? — A Washington spokesman told STEEL he is betting the program will get back in action before next June, but at a greatly reduced rate.

Slow, at Best

It is probably true that the loss of business to the machine tool industry won't be so large as the figures imply.

The Air Force got $85 million of the fiscal 1955 appropriations ($100 million). Only about $15 million has been obligated. The $100 million appropriated for the current fiscal year hasn't even been assigned.

Under the Wire — The last contract to be let by the Air Force under the program was for $3 million. It went to King Machine Tool Co., Cincinnati. The biggest spending spree took place last spring (STEEL, June 27, p. 43). It was for $11.2 million.

Apparent reason for the delay: High-level lethargy in the Defense department. With little enthusiasm at the top, lieutenants dragged their feet, took months to decide what they wanted to buy.

$64,000 Questions

Review by top officials also will ask these questions:

Should machine tool packages being held for an item that's now obsolete be broken up and reassigned to a current project?

Should reserve equipment be stored, or installed on current or stand-by lines?

Should tooling be purchased in the prototype stages, or when the item is ordered for production?

Radiation Testing

GAMMA RAYS are testing welds in large, complicated alloy steel castings (pipes, valves, etc.) at National Supply Co. The source, cobalt-60, penetrates up to 2½-in. of steel.

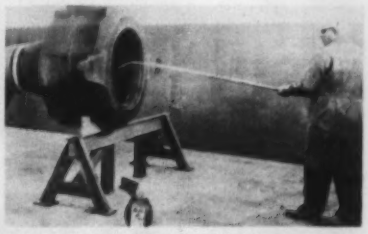
Metallurgists at the Toledo, O., plant are happy about the results they're getting (they used to purchase testing services) and how easy cobalt-60 is to use. All operators need to do is position the welded parts and move a 9-in. lead sphere. The savings in moving costs have more than justified the switch.

Handling — Operators do their stuff inside a room with 18-in.-thick concrete walls. A 7-foot pole is equipped with a releasing magnet to handle a ⅛-in. capsule that contains the radioactive cobalt. Placing the cobalt, length of exposure, film, etc., follow the usual techniques.

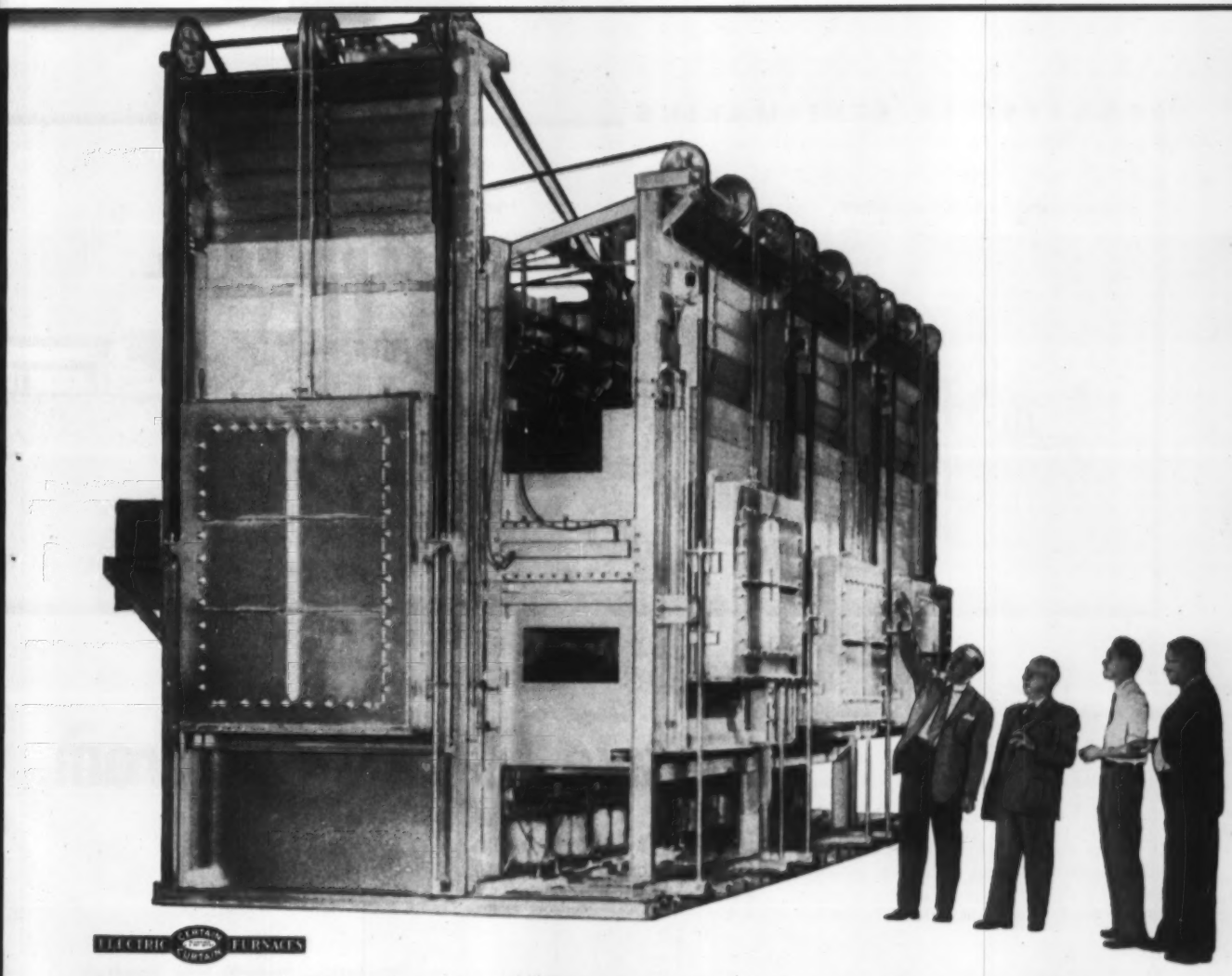
Preparation — X-ray film is wrapped around the outside or taped to one side of a weld and metal numbers placed to identify the film position and location of defects. Small, perforated metal blanks (called "penetrometers"), 2 per cent as thick as the weld, are placed next to the weld. The holes show up as dark spots on the developed film and serve as a comparison for other dark spots that may be defects in the weld. Opaque paper protects the film against light.

The cobalt-60 is then placed so that the rays penetrate the weld for periods from 20 minutes to 8 hours depending on the exposure desired.

Getting Some — STEEL's article, "Atoms Mean Business," (Oct. 31, p. 66) will help you find sources and useful information about weld testing with radioactive materials.



The weld under the white-taped x-ray film is tested by the ⅛-in. cube of cobalt-60 on the end of the rod

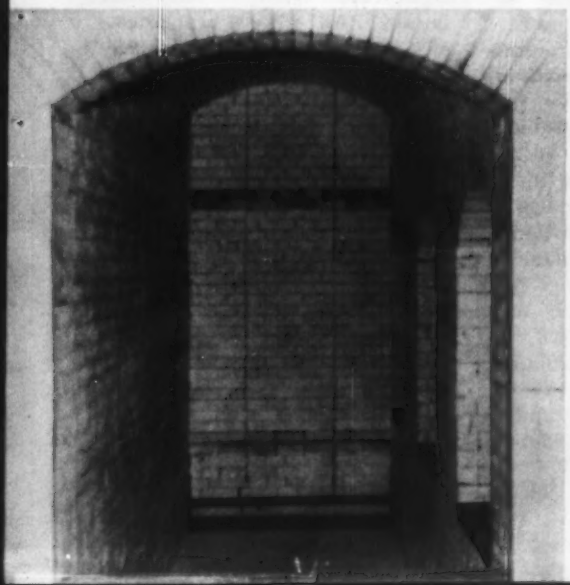


ELECTRIC FURNACES

SUPER REFRACTORIES REDUCE WEIGHT AND GIVE FAST HEAT-UP OF

world's largest electric steel forging furnace

Interior of heating chamber. It will accommodate 10,000-lb. steel forgings. The GLOBAR heating units and the CARBOFRAX hearth and piers had not yet been installed when this photo was taken.



The world's largest controlled atmosphere electric steel forging furnace was recently shipped from the Cranston, R. I. plant of C. I. Hayes, Inc. The big furnace is 17 feet high, 13 feet wide and 25 feet long over-all. It uses 45 GLOBAR® silicon carbide heating elements drawing 600 kilowatts to provide operating temperatures in the 2200°-to-2400°F. range. It will be used to supply billets up to 16 feet in length and 10,000 lbs. in weight for hot forging on a 50,000-ton press, one of the largest in existence.

C. I. Hayes used a carefully-worked-out combination of CARBORUNDUM Super Refractories to keep weight low and cut heat absorption of the lining to a minimum with greatest possible service life under working conditions:

A CARBOFRAX® silicon carbide hearth provides high thermal conductivity, abrasion-resistance, and load-carrying ability at the 2300°F. work chamber temperature.

CARBOFRAX piers have so much hot strength that they can be light and slender yet still furnish adequate support for the heavy furnace charges.

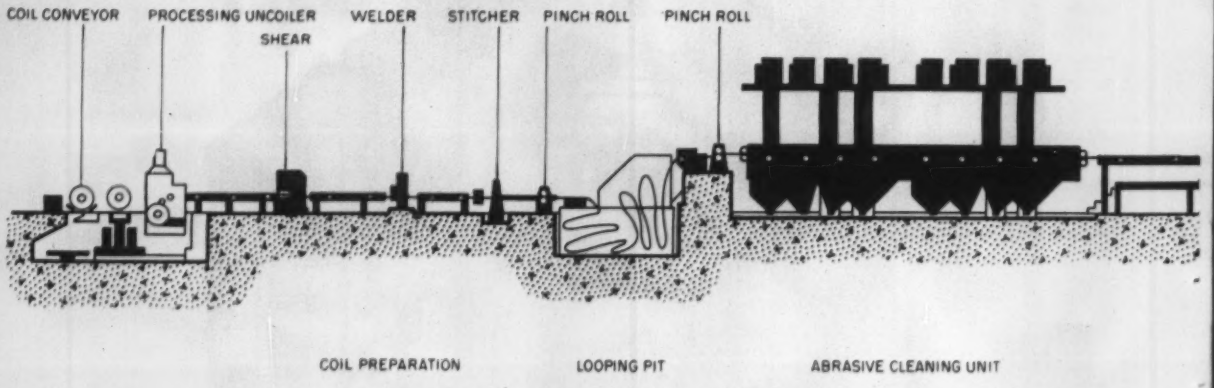
MULLFRAX® W electric furnace mullite skews are nonspalling and provide excellent load-carrying strength at high temperatures, with low heat conductivity.

ALFRAX® BI aluminum oxide brick are used for the sidewalls and roof. One of the most effective of all insulating materials for very high temperatures, these ALFRAX materials keep heat costs down; are light in weight, nonspalling and highly refractory.

This arrangement of CARBORUNDUM refractory materials gives the big furnace low heat storage and fast heating . . . is economical to operate and maintain. These Super Refractories can improve your furnaces in the same way. Why not check up on them now? Write Refractories Division, The Carborundum Company, Perth Amboy, N. J., Dept. W115.

CARBORUNDUM

Registered Trade Mark

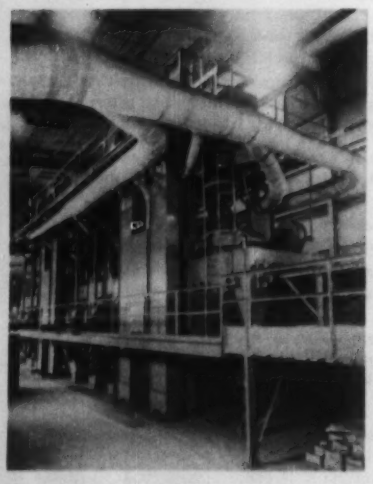


Abrasive Blasts Scale from

By GILBERT D. DILL
Engineer in Charge of Steel Division
Wheelabrator Corp.
Mishawaka, Ind.

WILL BLAST DESCALING spell the end of the pickling line?

Empire Steel Corp., Mansfield, O., is cleaning hot-rolled carbon steel strip by mechanical blast descaling and a short flash-pickle.



Exit end of the mechanical descaler. Ductwork at top leads to dust collector located outside the building

A First—While mechanical descaling of steel is not new, this is the first time it has been used to clean carbon steel strip in a producing mill. The descaler, built by Wheelabrator Corp., is the largest machine of its kind.

The cleaning line has adequate capacity to keep pace with the Bliss 4-stand, 4-high tandem cold mill, although the production of the descaler is limited only by the speed of the mechanical processing and handling equipment ahead of it.

Production—The line is cleaning strip ranging from 24 to 44 in. wide and 0.075 to 0.201 in. thick at the rate of 250 fpm (the speed requirement in this mill operation).

The Wheelabrator mechanical descaling section is 66 ft long. The flash-pickling section which follows is only 60 ft long.

A straight pickle installation would require about 250 ft of space for the production attained. Space saving here: Over 75 per cent.

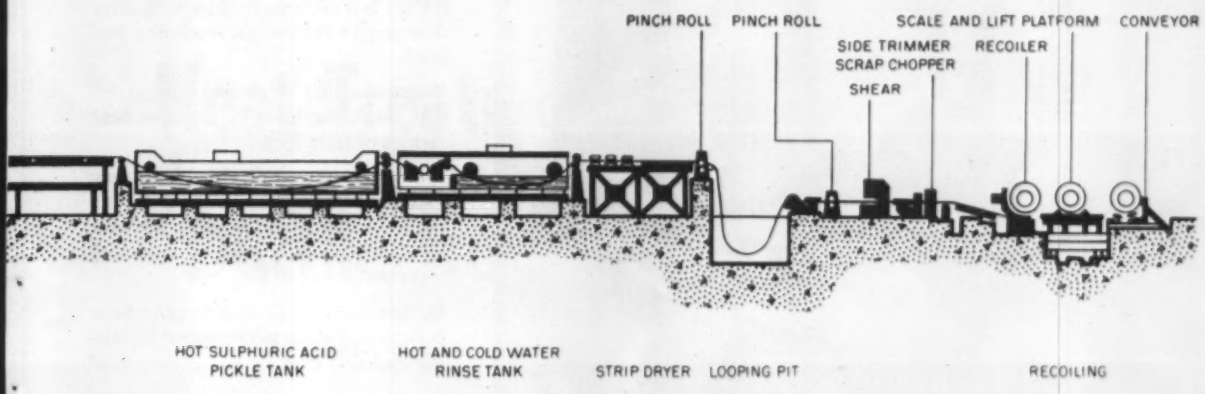
Cleaning—Descaling is handled by 16 Wheelabrator wheels, each of which throws 1000 lb of steel shot against the strip as it passes through the enclosed cabinet. Eight tons of abrasive (nominal particle size, 0.017 in.) scour the strip each minute.

Eight throwing wheels above the strip blast abrasive downward. Eight wheels below the strip blast upward. All wheels are adjustable so that both sides of any width strip up to 44 in. can be cleaned simultaneously as it passes through the cabinet.

Shot Reclaimed — Blowoff stations remove the shot from the strip leaving the cabinet, so abrasive is not carried out and lost.

When the abrasive is worn to a size where it is no longer practical for re-use, it is separated from the circulating system so that it can be reclaimed for other uses by sintering, briquetting or similar processing.

Flash-Pickling — As the strip leaves the Wheelabrator, it passes



Carbon Strip

through the flash-pickling tank which is equipped with rubber-covered depressor rolls that submit the strip to 55 ft of acid contact. This means the strip is in the acid about 13 seconds. Build-up of iron in the acid bath has been subnormal.

Line Components—The complete cleaning line is 525 ft long. At the entrance of the line are a scale-breaking McKay processor with a five-roll leveler, a squaring and cropping shear, a Morton butt welder and trimmer and a Wean mechanical stitcher. The welder joins three 8000-lb coils from the hot mill to make one 24,000-lb coil for the cold mill. The stitcher is used when a weld is not desired.

A space of 77 ft between the descaler and the acid tank is reserved for future capacity.

To permit the descaler to operate continuously, looping pits are provided in the line for storing strip. One of these precedes the Wheelabrator and one follows the cleaning operation.

Operating Speeds—The head section of the line operates at about 600 fpm, so that sufficient material can be stored to keep the cleaning section operating at 250 fpm while a weld or stitch is being made.

Time for shearing out stitches at the end of the line, to break the coils into individual units, is gained similarly. The sides of the head-end looping pit are adjustable, so that various widths of strip can be held in line to prevent twisting or misalignment.

A Wheelabrator Dustube collector of the cloth-tube-type ventilates the blasting equipment to prevent dust from accumulating in the working areas. It filters 23,000 cu ft of air a minute.

Trend in Design—Mechanical descaling equipment which will handle larger stock at faster production speeds is being designed. Each throwing wheel of a given size has a known cleaning rate for a particular application. Wheelabrator sees no practical limit to the number of wheels that can be combined.

Empire Steel's strip cleaning line was designed by Wean Engineering Co. Inc., Warren, O.

How Mechanical Descaling Stacks Up

After several months of production experience with the process, Empire Steel reports:

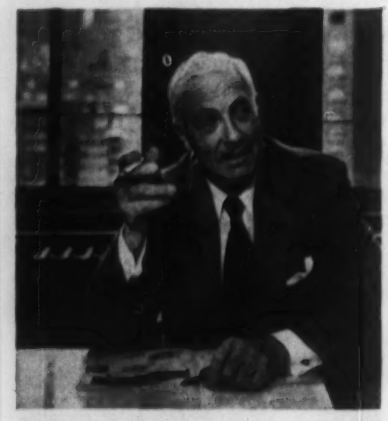
1. **Strip is flash-pickled in 16 per cent acid at 200°F in only a 13-second immersion. This compares with about 60 seconds of immersion for a normal, straight pickle line.**
2. **Strip is exceptionally clean and free of smut, has a good white color and is giving excellent results in the cold mill.**
3. **Etched finish produced by the descaler makes it easy to reduce the stock in the cold mill.**
4. **Steel is saved because practically none of the virgin metal is removed. It's possible to recover all the scale.**
5. **There is evidence that cleaning costs will be substantially below that of pickling.**

• *Extra copies of this article are available in quantities from one to three until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*

(Advertisement)

How Do Lightweight Refractories Cut Fuel Costs And Boost Furnace Output?

Here, certainly, is a timely question. There's a heavy squeeze today on most furnace operators for lower costs, larger production . . . or both. And despite all the economies they've put into effect so far, they're still searching hard for ways to make their furnace dollars do a bigger job.



The following discussion brings out a number of facts, often overlooked, about the money-saving, profit-building potentials inherent in *lightweight* insulating firebrick.

Q. First of all, just what do you mean by "lightweight" insulating firebrick?

A. Compared with dense, fireclay brick weighing approximately 7½ to 8½ pounds each, insulating firebrick range from about 3½ pounds down to slightly over 1 pound for various temperature requirements.

Q. What does this light weight have to do with lower production costs?

A. Briefly, heavy furnace linings waste your fuel dollars two ways:

They soak up and store large quantities of heat which are lost when the furnace is cooled; and they conduct and lose too much heat through the wall.

Lightweight insulating firebrick, on the other hand, contain millions of tiny air cells, heat up and cool quickly, absorbing and storing very little heat. Also, they resist heat flow, keeping it inside the furnace to do productive work.

Q. I can see why you would save on fuel — but how much?

A. There's no single answer to that question — there are too many variables to be considered. But to give you an idea of these savings, here are a few actual examples:

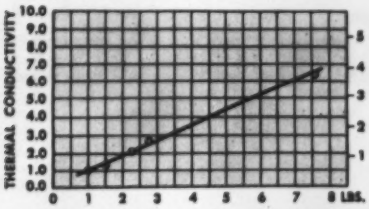
The operator of a large forge furnace cut his fuel costs more than 50% after changing to *lightweight* insulating firebrick.

A manufacturer of electric kilns states that insulating firebrick result in heat savings of fully 25%.

A magnesium melting crucible furnace that formerly used 1,000,000 BTU's per hour now does the same job with 500,000 BTU's, thanks to insulating firebrick.

Q. Increased production has also been pointed out as an advantage of insulating firebrick. How do you explain this?

A. Again the answer lies in lightness of weight. Because lightweight firebrick store and conduct less heat, they come up to operating temperature faster — cool down faster, too. This means — shorter heating cycles.



Relation between weight and thermal conductivity for several brands of kaolin base refractories. (mean temperature, 900F)

Secondly, because lightweight firebrick conduct far less heat than heavy, dense firebrick, you don't have to build as thick a wall. This gives you more hearth area per square foot of floor space.

Thirdly, lightweight firebrick respond more rapidly to changes in furnace heat input, which means closer temperature control and fewer rejects in many instances.

It's just like adding extra furnace capacity without adding to your furnace investment.

Q. Are there any differences in the performance of the various brands of insulating firebrick available?

A. Naturally, the *lighter* the brick the greater the fuel savings and furnace output. And the lightest insulating firebrick of all, for any temperature range — if you'll pardon our mentioning it — are B&W Insulating Firebrick.

THE BABCOCK & WILCOX CO.
Refractories Division
General Offices:
161 East 42nd St., New York 17, N. Y.
Works: Augusta, Ga. R-306

Heat Treating Ductile Iron

PART II

By DR. ROBERT E. SAVAGE
Metallurgist, Development & Research Division
International Nickel Co. Inc.
New York

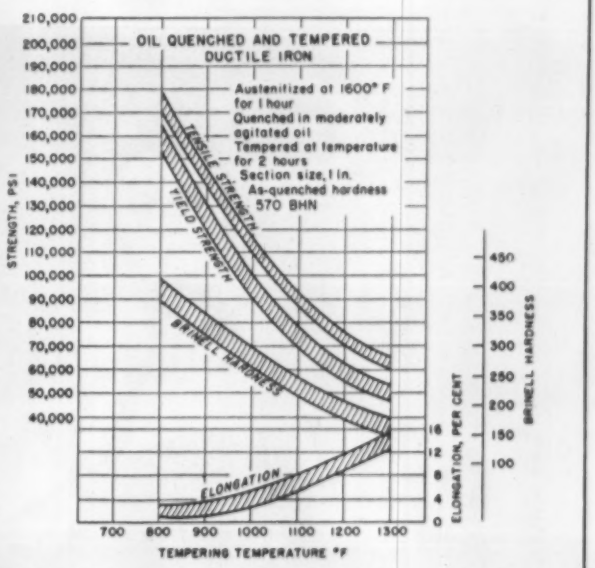


Fig. 3. Influence of tempering temperature on mechanical properties of oil quenched and tempered ductile iron

HEAT TREATING is the key to ductile iron's great range of mechanical properties.

Last week (STEEL, Nov. 21, p. 108) stress relief and annealing were covered. This article will deal with hardening treatments—normalizing, quenching and martempering, all followed by tempering; and induction and flame surface hardening.

Normalize and Temper — This treatment consists of: 1. Heating into the austenitizing temperature range so some of the carbon will go into solution. 2. Cooling in air to room temperature to form pearlite. 3. Tempering below the lower critical temperature to eliminate cooling stresses and to get the desired hardness.

Factors influencing this treatment are chemical composition, section size, prior austenitizing temperature and velocity and temperature of the air.

Typical properties are: Tensile strength, 100,000 to 120,000 psi; yield strength, 70,000 to 90,000 psi; elongation, 3 to 10 per cent in 2 in.; Brinell hardness, 240 to 300; Charpy impact, unnotched, 35 to 50 ft-lb.

Alloying elements, such as nickel and molybdenum, must be added to get these properties when casting heavy sections.

Cooling—Rate of cooling in air is the controlling factor in producing normalized properties.

Castings must be placed so air may circulate freely around them. They will not respond to a normalizing treatment if they are left to cool in the annealing pot.

Procedure—Heat the casting to 1600-1700° F and hold for 1 hour, plus 1 additional hour for each inch of controlling section size. Remove from the furnace, cool in air and temper for 1 hour, plus 1 additional hour for each inch of section. The tempering tempera-

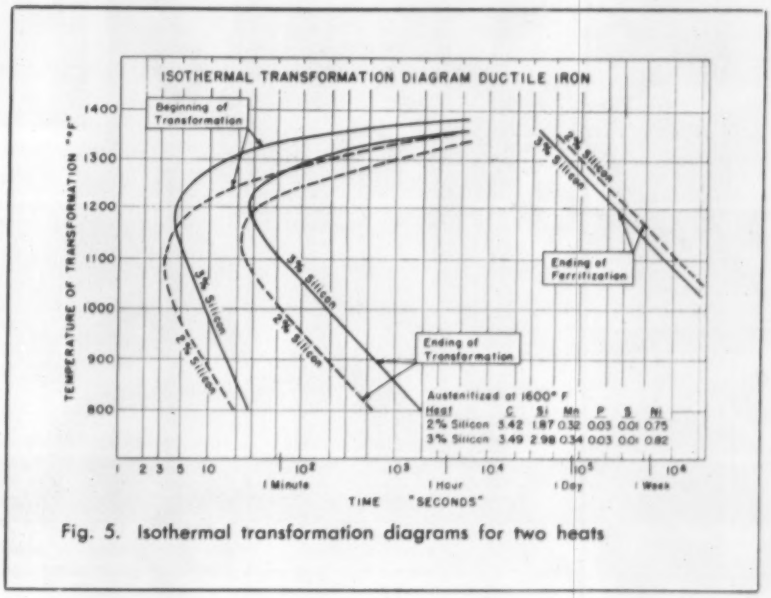


Fig. 5. Isothermal transformation diagrams for two heats

BRUSH OFF. Power brushes for polishing, deburring and rough metal finishing use CF&I-Wickwire Brush Wire.

HIGH FASHION FASTENERS. This eye-catching gown has hook and eye fasteners made of CF&I-Wickwire Hook and Eye Wire for secure, inconspicuous closures.

F O R T H O U S A N D S O F U S E S

from dressing up a beautiful lady...
to dressing down a metal casting...
nothing has so many uses as wire!

NO SHATTERED WINDOWS in this factory. The hex mesh netting for plate glass reinforcement is made of annealed CF&I-Wickwire Glass Netting Wire.

SOLE SUPPORT. Millions of nails—from shoemaker's tacks to heavy spikes—are used annually by scores of industries. Nails are made from CF&I-Wickwire Industrial Quality Basic Wire.

PIN-UP has been a snap for mothers ever since the invention of the safety pin. Today, millions of these indispensable fasteners are made from CF&I-Wickwire Safety Pin Wire.

FOR DRIVING SAFETY. This windshield wiper is operated by dependable, high tensile strength CF&I-Wickwire Cord Wire.

Everybody knows that steel is indispensable to today's manufacturer, today's living . . . yet few people realize that wire is the most widely applicable, the most versatile form in which steel is used. Here's the reason — wire lends itself to thousands of extremely diversified applications. Strength? Wire has it. Ductility? Wire is the first thing you think of. Good looks? Wire can be plated and finished in many attractive ways. On every score, nothing offers so many useful and variable properties as wire.

Whatever you make, process, or assemble, you'll find that CF&I-Wickwire Wire fits into the picture to perfection. We have the experience and the facilities to provide exactly the wires you need from plants conveniently located from coast to coast. Write our nearest sales office for complete details.

3148

CF&I-WICKWIRE WIRE

THE COLORADO FUEL AND IRON CORPORATION—Albuquerque • Amarillo • Billings • Boise • Butte • Denver
El Paso • Ft. Worth • Houston • Lincoln (Neb.) • Oklahoma City • Phoenix • Pueblo • Salt Lake City • Wichita
PACIFIC COAST DIVISION—Los Angeles • Oakland • Portland • San Francisco • Seattle • Spokane
WICKWIRE SPENCER STEEL DIVISION—Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York • Philadelphia

CF&I

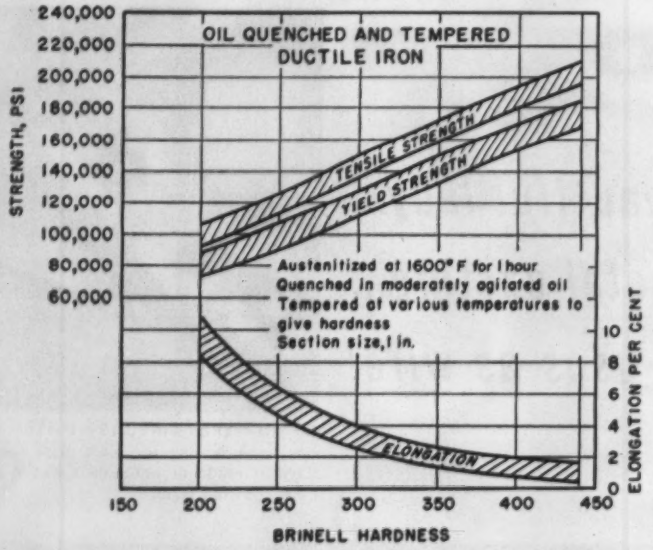


Fig. 4. Relationship between mechanical properties and Brinell hardness of ductile iron in the oil quenched and tempered condition

ture depends on the desired hardness and mechanical properties.

Quench and Temper—This treatment consists of: 1. Heating into the austenitizing temperature range to get the carbon into solution. 2. Quenching in a liquid to form martensite or intermediate products. 3. Tempering below the lower critical temperature to eliminate quench stresses and temper martensite to desired hardness.

Typical properties obtained by quench and temper are: Tensile strength, 120,000 to 150,000 psi; yield strength, 90,000 to 125,000 psi; elongation, 2 to 7 per cent in 2 in.; Brinell hardness, 270 to 350; Charpy impact, unnotched, 25 to 40 ft-lb.

Temperature — Austenitizing temperatures of 1550 to 1700° F normally produce the highest as-quenched hardness. Hold the casting at temperature for 1 hour, plus 1 additional hour for each inch of section. To reduce the severity of the quench, it is often desirable to cool to 1550° F before quenching.

Parts may be quenched in oil, water or salt baths. Oil is most common since it minimizes as-quenched stresses. The casting will have its highest Brinell hardness after quenching.

Tempering — Parts should be tempered for 1 hour, plus 1 additional hour for each inch of section size at a temperature which will give the desired hardness and mechanical properties (Fig. 3).

In both normalized and tempered and quenched and tempered ductile iron, a definite relationship exists between the tensile strength, yield strength and elongation, versus the Brinell hardness number. By knowing the Brinell hardness, mechanical properties may be predicted. The ratio of tensile strength to Brinell hardness is about 475:1 for both treatments.

Fig. 4 shows this relationship for quenched and tempered castings. To obtain these properties in heavy sections, additional alloying elements, such as nickel or molybdenum, must be added.

Martempering — This treatment is used for hardening when minimum distortion is required. Partial isothermal transformation diagrams for two compositions of ductile iron are shown in Fig. 5. Such diagrams are helpful in selecting times and temperatures for martempering dutile iron castings.

Martempering consists of heating into the austenitizing range for 1 hour, plus 1 additional hour for each inch of section thickness. Then parts are quenched in a salt bath at some intermediate temperature and held for sufficient time to transform part of the austenite to intermediate products.

Cool and Temper—Cool the casting to room temperature. Temper for 1 hour, plus 1 additional hour for each inch of section at the salt

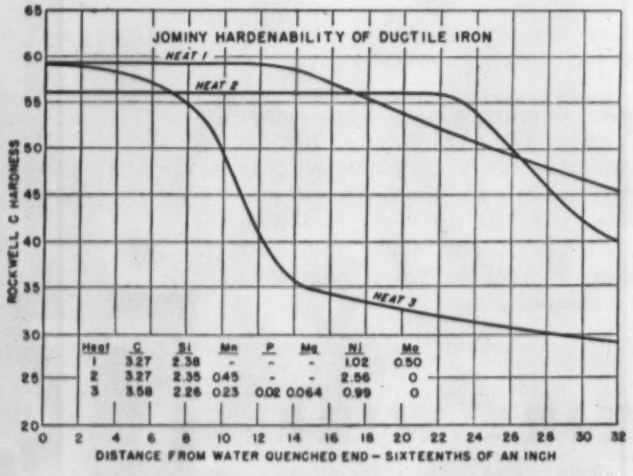
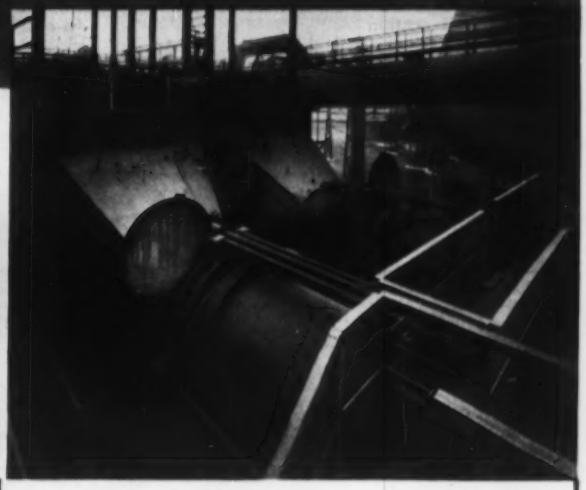

JOMINY HARDENABILITY OF DUCTILE IRON
HEAT 1
HEAT 2
HEAT 3
ROCKWELL C HARDNESS
65
60
55
50
45
40
35
30
25
20
Heat C Si Mn P Mg Ni Mo
1 3.27 2.38 - - - 1.02 0.50
2 3.27 2.35 0.45 - - 2.56 0
3 3.58 2.26 0.23 0.02 0.064 0.99 0
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32
DISTANCE FROM WATER QUENCHED END – SIXTEENTHS OF AN INCH

Fig. 6. Typical Jominy hardenability curves of ductile iron

Industrial Gas Mains 6" to 120" ... are best controlled by

Bailey GOGGLE VALVES

PROVED SAFE AND EFFICIENT ON GAS WASHERS, BLAST FURNACE MAINS, PRECIPITATORS, BOILER PLANTS



Mechanical Type

By means of a powerful clamping force applied equally at all points around the disc periphery, the Bailey Mechanical Goggle Valve provides a safe, tight seal for gas mains from 6" to 72" in diameter. The goggle plate is freed instantly by the same powerful mechanism, regardless of the length of time between operations. Both this type and Bailey Thermal Expansion Valves require only a minimum of maintenance.

Thermal Expansion Type

Designed for gas mains from 36" to 120", the Bailey Thermal Expansion type goggle valve operates by the linear expansion and contraction of three sets of steel tubes. When steam is applied, the tubes expand and separate the flanges, thereby freeing the goggle plate for swinging to open or closed position. When steam is removed, normal cooling contracts the tubes, which then clamp the flanges together to form a gas-tight leakproof seal. Can be hand-operated in case of steam failure.

Bailey ENGINEERS

1221 BANKSVILLE ROAD PITTSBURGH 16, PA.

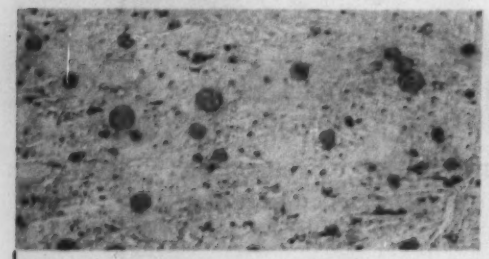
bath temperature or slightly lower.

The hardness developed will depend on the chemical composition, section size of the casting, temperature of the salt bath and time of holding. Rockwell C hardnesses of 40 to 50 are obtained easily by this treatment. Ductile iron has good hardenability characteristics which are due to the availability of the carbon for hardening the matrix structure.

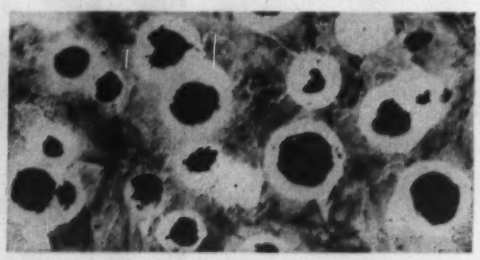
Surface Hardening—It is sometimes desirable to surface harden ductile iron to provide a hard case having up to Rockwell C 60 hardness but retain good ductility and impact resistance in the core. Two processes: Induction and flame hardening are used.

Induction—The matrix of ductile iron should be predominantly pearlitic prior to induction hardening. Types 80-60-03 and 100-

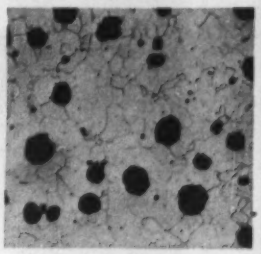
TYPICAL MICROSTRUCTURES



As-cast, light section



As-cast, moderate to heavy section



Annealed

HEAT TREATMENTS

TYPICAL MECHANICAL PROPERTIES

Heat Treatment	ASTM type	Tensile Strength (psi)	Yield Strength (psi)	Elongation (per cent)	Hardness	Charpy Impact Unnotched (ft lb)
As-cast, light section	....	.....	.....	.....	.....	.....
As-cast, moderate to heavy section	80-60-03	80,000–100,000	60,000–75,000	3–10	200–270 Brinell	15–65
Stress relief	....	.....	.....	.....	.....	.....
Softening Treatment						
Anneal	60-45-10	60,000–80,000	45,000–60,000	10–25	140–200 Brinell	60–115
Hardening Treatments						
Normalize & temper	100-70-03	100,000–120,000	70,000–90,000	3–10	240–300 Brinell	35–50
Quench & temper	120-90-02	120,000–150,000	90,000–125,000	2–7	270–350 Brinell	25–40
Martemper & temper	....	.....	.....	.....	40–50 Rockwell C	.....
Surface Treatments						
Flame hardening	....	.....	.....	.....	Up to 60 Rockwell C	.....
Induction hardening	....	.....	.....	.....	Up to 60 Rockwell C	.....

70-03 respond well. Normalized and tempered or stress relieved castings are preferable.

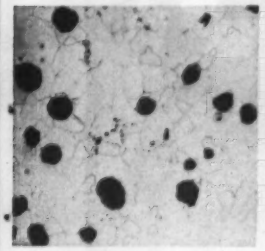
Using stress-free castings, with a predominantly pearlitic matrix, induction heating time is held to a minimum. This minimizes the possibility of cracking.

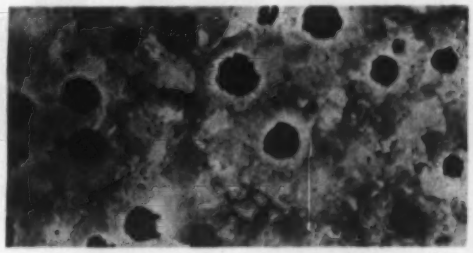
Procedure — Bring the surface to the austenitizing temperature quickly by induction heating. Then cool the surface in air or liquid quench. A martensitic structure is produced.

The casting should be tempered after hardening to minimize stresses caused by the process.

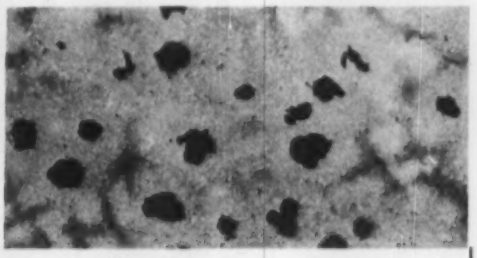
Flame—Ductile iron responds in a similar manner to flame hardening. The treatments for induction hardening are applicable.

• *Extra copies of this article are available in quantities from one to three until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, O.*





Normalized and tempered



Quenched and tempered

OF DUCTILE IRON

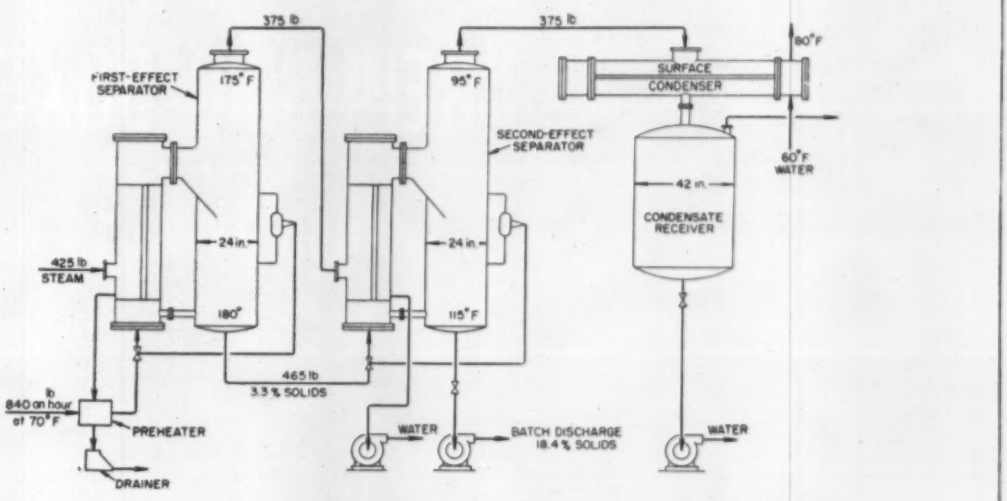
Typical Heat Treatment Cycle*	Characteristics	Typical Applications
None	Low mechanical properties due to carbidic structure usually present in light sections (under ¼-in.). Excellent wear resistance but low impact resistance. Easily heat treated	Rolls, plow points, applications requiring a chilled surface
None	Essentially pearlitic matrix in moderate sections (¼ to ¾-in.) giving higher tensile strength and hardness. Ferrite increases in sections over ¾-in., giving lower tensile strengths and hardnesses. Pearlite stabilizing alloys must be added if pearlite is desired in heavy sections. Good machinability and toughness. Responds readily to flame or induction hardening	Wear and strength applications for automotive, aeronautical, diesel, agricultural, heavy machinery, mining, paper, textile and other related industries. Gears, crankshafts, bases, crowns, etc.
Heat to 1000–1250° F and hold 1 hour, furnace cool to 700° F, then cool at any rate to room temperature	Microstructures similar to as-cast material. At higher stress relief temperatures, more ferrite forms. All as-cast castings should be stress relieved if complex engineering castings	Same as as-cast ductile iron
(1) Heat to 1650° F and hold 1 hour, cool to 1275° F and hold 5 hours, furnace or slow cool to room temperature (2) Heat to 1650° F and hold 1 hour, furnace cool to 1200° F controlling cooling rate between 1450 and 1200° F to maximum of 35° F per hour, furnace or slow cool to room temperature (3) If no carbides are in as-cast microstructure, heat to 1300° F and hold 5 hours, furnace cool to 1100° F, slow cool to room temperature	Essentially ferritic matrix. Pearlite stabilizing elements should be held to a minimum. Maximum machinability and toughness. Most weldable type. Not readily flame or induction hardened	Pressure castings, valve and pump bodies, compressor heads, pipe, fittings, shock resistant parts for automotive, agricultural, electrical, railroad, machine, marine and general use, such as gear housings, levers, motor frames, etc.
Heat to 1650° F and hold for 1 hour, cool in air to room temperature. Temper to desired hardness	Essentially pearlitic matrix. Combination of strength, toughness and wear resistance. Pearlite stabilizing alloys must be added to obtain these mechanical properties in heavy sections. Readily flame or induction hardened	Gears, crankshafts, camshafts, pistons, agricultural implement parts such as bolsters, bolster forks, ratchets, governor weights, track shoes, reactor brake drums
Heat to 1550–1600° F and hold for 1 hour, quench in oil. Temper to desired hardness	Alloys imparting hardenability (nickel, molybdenum, etc.) must be added to obtain adequate hardenability in heavy sections. Readily flame or induction hardened	Pinions, gears, cams, dies, machine guides, track rollers, idlers, tractor steering, gear arms, drill press columns, pump liners, clutch drums
Heat to 1600° F and hold for 1 hour, quench in salt bath at intermediate temperature to desired hardness. Cool to room temperature. Temper at or slightly below salt bath temperature	Alloys imparting hardenability (nickel, molybdenum, etc.) must be added to obtain adequate hardenability in heavy sections. Distortion during heat treatment is minimized	Pump liners and other applications requiring good wear resistance and minimum of distortion
	Matrix should be predominantly pearlitic or martensitic prior to flame hardening	Gears, crankshafts, dies, machine guides, etc.
	Matrix should be predominantly pearlitic or martensitic prior to induction hardening	Gears, crankshafts, dies, machine guides, etc.

* Allow 1 additional hour at each holding temperature for each inch of section thickness

SHIP BUILDING • SHIP REPAIRING • FOUNDERS • PROPELLERS • STRUCTURAL STEEL

AVONDALE MARINE WAYS, INC. CABLE ADDRESS "AVONWAYS"

P. O. BOX 1030 • PHONE UNiversity 4561 • NEW ORLEANS 8, U. S. A.



Flow diagram of the evaporator for recovering zinc plating solution from rinse water

Cyanide Recovery Pays Double Dividend

FACED WITH a cyanide disposal problem, a maker of television antennas found he could recover his zinc plating solution from rinse water cheaper than he could destroy it.

To chlorinate the cyanide-polluted water would cost 60 cents per pound of sodium cyanide destroyed. To recover it costs 18 cents per pound.

Equipment—The antenna manufacturer, Channel Master Corp., Ellenville, N. Y., processes its rinse water through a double-effect evaporator made by the Buflovak Equipment Division of Blaw-Knox Co. Rated capacity of the equipment is 750 lb of water an hour when supplied with 100 gallons of rinse water containing 1.85 per cent solids.

In the recovery of plating solution, enough water is evaporated to increase the concentration of cyanides up to 12 to 15 ounces per gallon in the evaporator. Operating temperatures of the equipment are low enough to prevent conversion of the cyanides to carbonates. Use of double-effect evaporation reduces steam requirements to half that required by single-effect evaporation.

First Step—Waste plating solution is collected in a 300-gallon tank from the overflow of the first of four rinse tanks. Rinse water normally cascades from tank to tank countercurrent to the movement of plated products. Flow rate ranges from ½ to 1½-gpm. Concentration of sodium cyanide, zinc cyanide and sodium hydroxide in the first rinse tank may be as high as 1.25 to 1.50 ounces per gallon of water, but usually is less than half this much.

If the rinse water contains any chromate from accidental contamination, it is neutralized by the addition of sodium hydrosulphide in the holding tank.

First Effect—The contaminated rinse water is pumped from the holding tank through a preheater or heat exchanger into the first-effect evaporator tubes. It flows upward through the tubes at high velocity, absorbing heat from the surrounding steam chest.

Low pressure steam raises the temperature of the preheated solution to a boiling point of about 180°F—determined by a vacuum maintained in the first-effect separator. The condensing steam then passes through the preheater to give some of its remaining heat to the incoming rinse solution, and is discharged through a conventional steam trap to waste.

Second Effect—The portion of the waste rinse water that is evaporated and separated in the first effect is used as the heating medium in the steam chest of the second-effect evaporator. Here a higher vacuum reduces the boiling point to 115°F.

To keep entrainment to a minimum of 5 ppm, the vapor head of each evaporator is equipped with a York mesh demister. The portion of the rinse water that collects as condensate in the first-effect separator is passed to the second-effect separator.

Recovery — Three products are removed after second-effect evaporation. Two of them are distilled water—condensate from the second-effect steam chest and the condensed water from the separator. The latter passes into a surface condenser where its temperature is reduced by cooling water and then into a condensate receiver under vacuum. The distilled water from steam chest and condensate receiver are pumped independently into a 300-gallon holding tank to be re-used as plating rinse water.

The third product, condensate

REPUBLIC BOXES and simplify parts handling

Republic Boxes and Skids are used on the production line at Toledo Scale. Parts are moved from one machining operation to another quickly and easily by lift truck or hand-operated units.

Finished parts are stored in neat areas like this. Boxes are labeled with part numbers. Box and skid design permits easy visual inspection for inventory checks. Fits in nicely with other-type units.

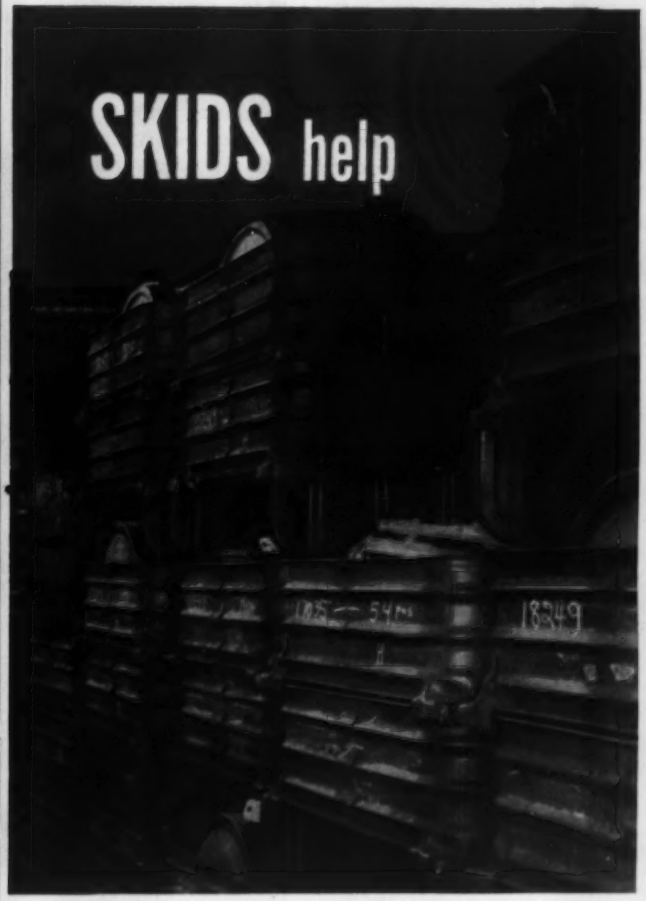
...provide Toledo Scale with keep everything

Neat, wide, uncluttered aisles are typical of the Toledo Scale Company plant at Toledo, Ohio. Republic Steel Box and Skid Units are used at practically every stage of production, from receiving to shipping.

For example, keeping track of and handling the thousands of parts needed for the products manufactured by Toledo Scale could be a difficult job. But, the company does it efficiently and at low cost with the help of Republic PB-130 Box and Skid Units.

These units are specifically designed for stacking. Box capacity can be varied by adding or removing ring sections. Stacking brackets are welded to the bottom corners of each box. Tiering lugs are welded to some boxes so that, when they are used as the top section, additional complete units can be tiered.

The skids are equipped with bumper-type channel runners. These are arc welded to the skid legs adding



a place for everything— in its place

strength to the sides and protecting skid ends and floor surfaces.

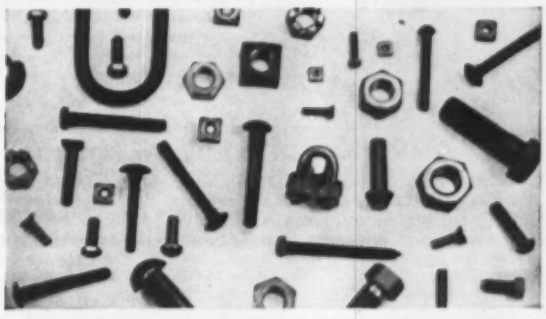
The PB-130 is only one of many types of box and skid units manufactured by Republic's Pressed Steel Division. There is a wide range of sizes from which to choose. Or if you have a special handling problem, Republic engineers are available to help you design a unit to meet your individual requirements. The coupon will bring you more facts by return mail.

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

SIMPLIFY WEIGHT PROBLEMS WITHOUT LOSS OF VITAL STRENGTH. The high strength-to-weight ratio of Republic Alloy Steels permits smaller sections to carry heavier loads safely, like the gears and shafts of this huge power shovel. Vital parts are tough—resist shock, impact, vibration. Republic metallurgists will help you select the proper analysis for your product.

SIMPLIFY YOUR FLAT ROLLED STEEL PROBLEMS. Republic produces a wide line of flat rolled products including hot and cold rolled sheets and strip, galvanized, galvannealed, electro-zinc-plated, silicon steels and many others. The world's widest strip mill—98 inches—operated by Republic, produces steel wide enough for one-piece auto tops.



SIMPLIFY YOUR FASTENER BUYING. Republic's Bolt and Nut Division makes more than 20,000 regular types and sizes of headed and threaded products—over 8,000 specials. Everything from machine bolts to "Nylok" Nuts and high-strength bolts. You can depend on Republic Fasteners for quality, ease of application, uniformity, long service life. Quick delivery, too.

REPUBLIC STEEL CORPORATION
3120 East 45th Street
Cleveland 27, Ohio

☐ Please have a Materials Handling Engineer call.

Please send more information on:

☐ Materials Handling Equipment ☐ Alloy Steels
☐ Sheets ☐ Fasteners

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

K-6903A

You can solve your **tough** corrosion problems by using Bitumastic® Coatings

ACID FUMES, alkaline fumes and high humidity soon corrode unprotected metal in textile mills. These dye tanks, in a large New England worsted mill, are coated with Bitumastic® Black Solution. For over six years, this specialized coating has been used successfully to protect these tanks against corrosive chemical agents and moisture.

TOUGH CORROSION PROBLEMS can be solved, but not by using ordinary paints or conventional protective coatings. For long-term protection, it takes *specialized* protective coatings . . . the Bitumastic Coatings Koppers makes.

Bitumastic Protective Coatings are specially formulated from a tar-pitch base* that is, for all practical purposes, impervious to moisture. These coatings keep moisture away from exposed metal surfaces . . . and that's the *best* way to stop corrosion.

With tough, durable Bitumastic Protective Coatings, a thickness up to eight times that of ordinary paints can be obtained in one application. Where other factors are equal, the *thicker* the coating the *longer* the period of protection.

Send for a set of free booklets describing the family of Bitumastic Protective Coatings. At the same time, tell us about *your* corrosion problems so that we can suggest a satisfactory solution. There is no obligation, of course.

** Hi-Heat Gray is a non-coal-tar vehicle and metallic pigment.*

KOPPERS COMPANY, INC.
Tar Products Division, 1178-T, Pittsburgh 19, Pennsylvania
DISTRICT OFFICES: BOSTON, CHICAGO, LOS ANGELES, NEW YORK, PITTSBURGH, AND WOODWARD, ALA.
KOPPERS PRODUCTS LIMITED District Offices: Toronto & Edmonton

MADE ONLY BY KOPPERS
BITUMASTIC PROTECTIVE COATINGS
SOLD THROUGH INDUSTRIAL DISTRIBUTORS
KOPPERS ®

in the bottom of the second-effect separator, is plating solution of about the same composition as the original. It is pumped into another 300-gallon holding tank.

Automatic Operation — Distilled water in the receiver is pumped out automatically when it reaches a preset level. If more rinse water is required than is obtained by evaporation of the contaminated rinse water, it is obtained from the steam that condenses in the preheater and in the heating coils of the first effect.

Operation of the evaporators is automatic. Circulation is maintained by thermal difference. Steam input to the evaporator is regulated by a float control operating on the solution level in the holding tank. Solution level in the separators regulates the flow of waste rinse water into the evaporators.

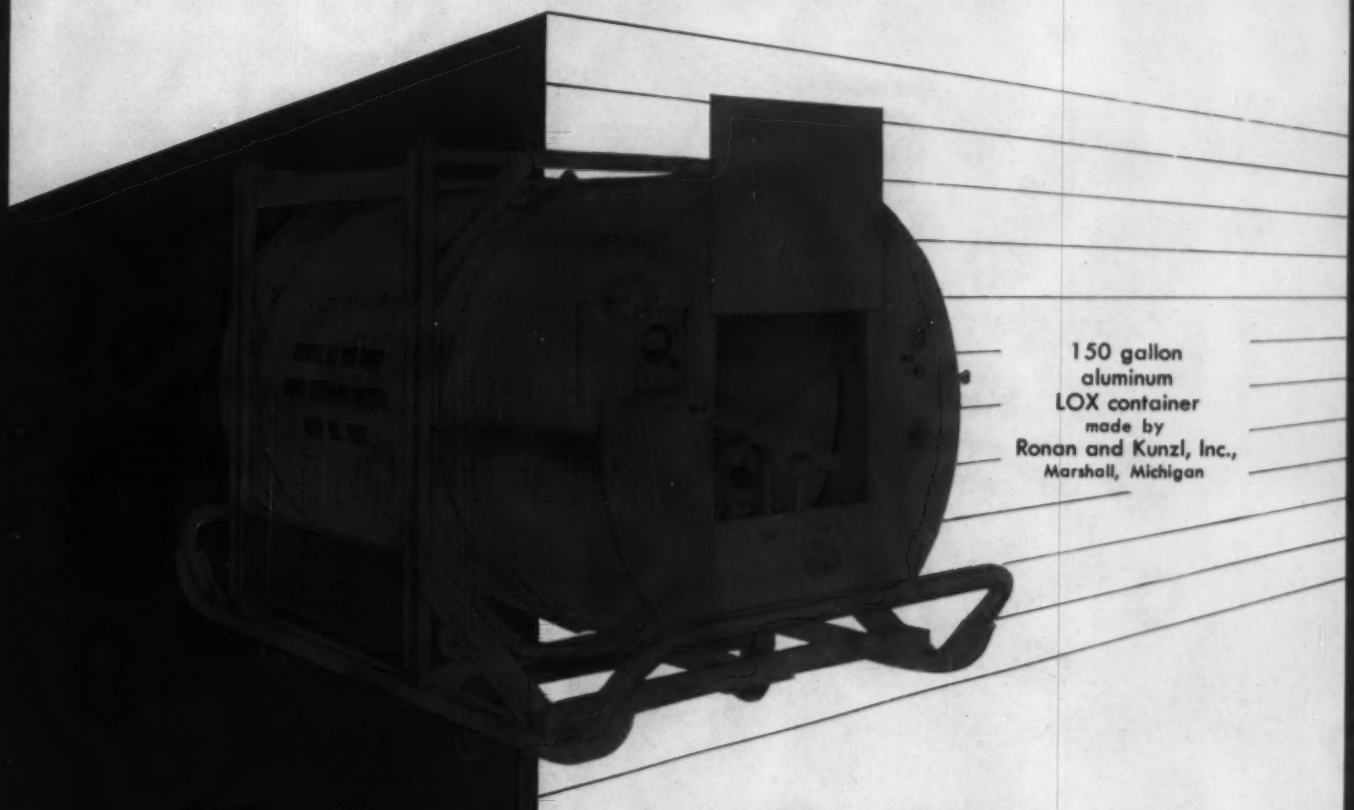
Economically Practical — High efficiency of heat transfer is one of the principal features of the Buflovak evaporator that makes the reconcentration of plating solution economically practical.

Further efficiency of operation results from the tangential method of introducing vapor and liquid into the vapor separator. The resulting centrifugal separating action allows the vapor to rise without breaking through a falling stream of water.

Cost—Operating experience indicates a steam consumption of 90 lb of 15-psi steam per pound of sodium cyanide recovered. An ejector unit used with the evaporator requires an additional 50 lb at 90 to 100 psi. About 500 gallons of cooling water at 60°F are required for each pound of sodium cyanide recovered.

With steam at $1 per 1000 lb and cooling water at 7 cents per 1000 gallons, these costs add up to 18 cents per pound of sodium cyanide recovered. These figures cover the recovery of zinc cyanide and sodium hydroxide. Total labor is less than 1 man-hour per 8-hour shift.

The system is recovering the drag-out from about 11,000 gallons of zinc plating solution in the plating tanks. It has a maximum capacity of 160 lb of sodium cyanide a day.



150 gallon
aluminum
LOX container
made by
Ronan and Kunzl, Inc.,
Marshall, Michigan

50 Micron Vacuum Plus 50 psi Pressure Test Strength of Welded Aluminum in Liquid Oxygen Tank

To retain oxygen in its liquid state Ronan and Kunzl LOX tanks are designed like large vacuum bottles using the Dewar principle. A double-walled aluminum container is heliarc-welded to successfully sustain a vacuum below 50 microns plus inner tank pressures up to 50 psi. Internal pressure is the result of a method used to discharge the liquid oxygen. The 150 gallon LOX container, illustrated, as well as 50 and 500 gallon models are designed to Air Force specifications and made of Reynolds Aluminum.

The weldability of aluminum was just one factor in its selection for the liquid oxygen containers. Aluminum was also selected because it is lightweight and because it remains ductile at −300 F. Only a metal with aluminum's ductility could withstand the thermal shock to which these containers are exposed. And only aluminum met the rigid strength per pound requirements of the Air Force.

In addition to tank elements, the framework and skids of LOX containers are also made of aluminum. Alloy selection for the various parts was based on recommendations of Reynolds Engineering Service.

Here, as in so many other high performance applications, light, strong rustfree aluminum does the job better. See the next page for information on how you can design and fabricate aluminum more efficiently and profitably.

This seal is a symbol of quality aluminum to millions. Find out how it can add sales appeal to your products.

Designed for REYNOLDS ALUMINUM

See Reynolds New Program "Frontier"—Sundays on NBC-TV.

REYNOLDS ALUMINUM

MODERN DESIGN HAS ALUMINUM IN MIND

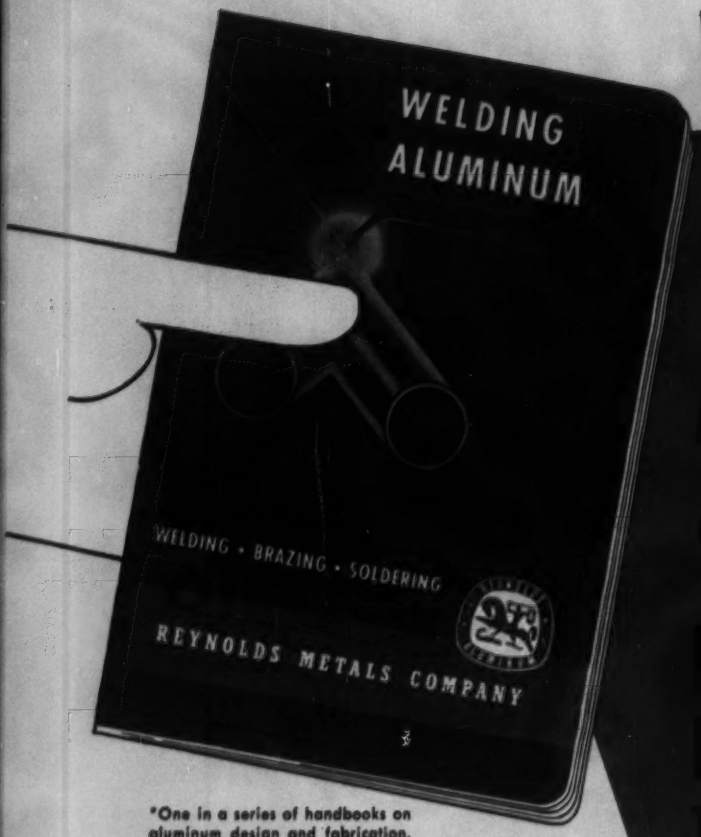
WELDING

cuts costs—reduces weight

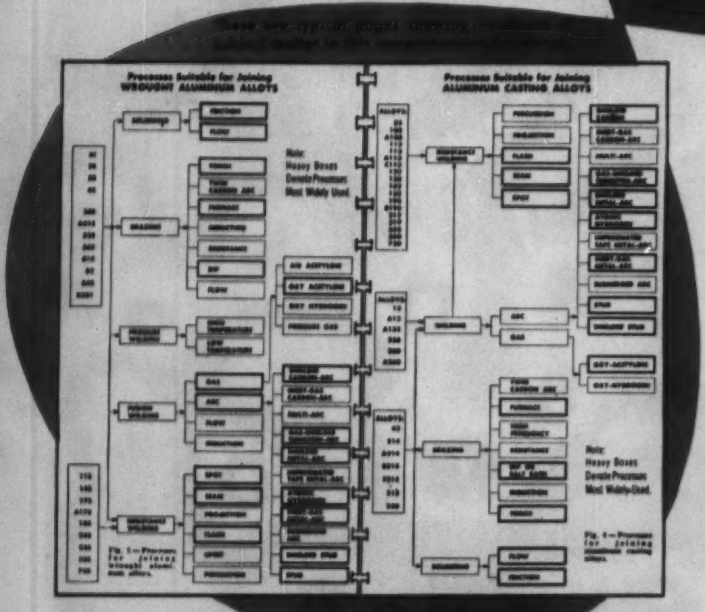
ALUMINUM

cuts costs—reduces weight

186 PAGE REYNOLDS HANDBOOK* Tells You How



*One in a series of handbooks on aluminum design and fabrication.


Processes Suitable for Joining WROUGHT ALUMINUM ALLOYS
Processes Suitable for Joining ALUMINUM CASTING ALLOYS
Note: Heavy Boxes Denote Processes Most Widely Used.
Fig. 1—Processes for joining wrought aluminum alloys.
Note: Heavy Boxes Denote Processes Most Widely Used.
Fig. 1—Processes for joining aluminum casting alloys.

Anyone familiar with welding other metals will find all he needs to know about welding aluminum in this new 186-page handbook.

This is a new edition with information on 34 processes for welding, brazing and soldering aluminum and its alloys. It thoroughly discusses the various methods and techniques and recommends the processes best suited to each design requirement.

For assistance with your problems in aluminum fabrication you can request the direct consultation of men from Reynolds Engineering Service. They will gladly work with your own designers, engineers and production men on your particular aluminum applications. For your free copy of "Welding Aluminum" and a complete index of Reynolds technical literature, write on business letterhead to *Reynolds Metals Company, P.O. Box 1800-JL, Louisville 1, Kentucky.*

See Reynolds New Program "Frontier"—Sundays on NBC-TV

REYNOLDS ALUMINUM

NEW!

WATERBURY FARREL SLOTTER

"Model 5"

DELIVERS UP TO 51,840 (BURR FREE) BLANKS PER HR....

SLOTS STANDARD & SPECIAL SCREW HEADS, FERROUS OR NON-FERROUS BLANKS #6 TO ¼" DIA., UP TO 2½" LONG, AT VARIABLE SPEEDS FROM 60 TO 864 PER MINUTE.

ONE "Model 5" Outproduces TWO Earlier Type Slotters

The speed and work range of this completely new Waterbury Farrel slotter make it more productive than a *pair* of earlier type slotters which used indexing dials and saw-into-work sequence.

The "Model 5" has long and short run versatility, too. Its simplicity and rapid set up make it economical for short runs while its high speed pays extra dividends on long runs.

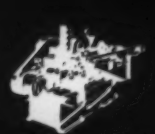
Inexpensive Tooling

The only tooling required is a saw and burr-remover blades made inexpensively from spring steel. One dial, furnished as standard equipment feeds the above range of blank diameters. Special dials can be furnished for other blank diameters.

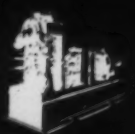
WATERBURY FARREL
Foundry and Machine Company
WATERBURY, CONN.

Branch Offices: Chicago • Cleveland • Millburn, N. J.

For further information, write for free bulletin or contact your nearest WF representative, today.


Bolt, Nut & Screw Machinery

Power Presses


Rolling Mill Machinery

Wire Mill Equipment

Sendzimir Mills & Other Special Machinery

WATERBURY FOUNDED 1851 FARREL

Alliance Sheet Carriers...

KEEP YOUR SHEETS ON THE MOVE

Alliance
SHEET CARRIER

● The big **Alliance Sheet Carrier** moves sheets when and where you want them—travels from building to building; handles loads as heavy as those moved by light cranes and does crane duty in buildings where light construction makes cranes impractical. It's stable, easy to operate and highly maneuverable. We build to the capacity you specify with diesel-electric or gasoline-electric power. Specifications include hydraulic lift, clamp and steering. Write for details. Let us show you how the **Alliance Sheet Carrier** can eliminate delays and keep floors clear in your plant.

THE ALLIANCE MACHINE COMPANY

FOUNDED 1901

MAIN OFFICE • ALLIANCE, OHIO

Give Us The Runway
And We'll Lift The World

Manufacturers of:
LADLE CRANES • GANTRY CRANES • FORGING MANIPULATORS • SOAKING PIT CRANES • STRIPPER CRANES • SLAB AND BILLET CHARGING MACHINES • OPEN HEARTH CHARGING MACHINES • SPECIAL MILL MACHINERY • STRUCTURAL FABRICATION • COKE PUSHERS • ORE BRIDGES • SHEET CARRIERS

Cable Puller Saves Time, Energy and Money

No longer do you have to push a fish tape through long runs of conduit and pull the wire back by hand.

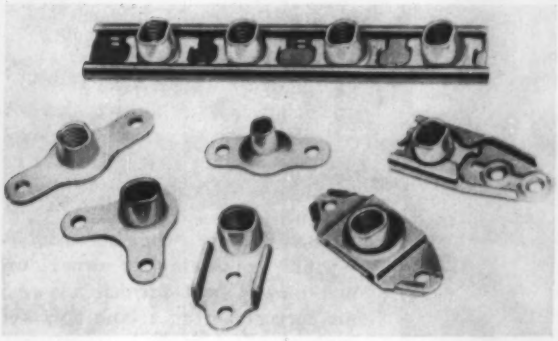
The cable puller will push 175 ft of steel fish tape through conduit with up to five 90-degree bends. Its pulling capacity is 1200 lb, regardless of wire or conduit size.

The tape has a tensile strength of about 250,000 psi. Because it is always in the tool or in the conduit, it is practically impossible to buckle or break it.

The tool has a lightweight, high-torque motor. It can deliver 2 hp up to 15 minutes, sufficient time to pull any cable the unit can handle.

Special fittings couple the cable puller to the conduit. A flexible sleeve grips the cable firmly. *Write*: Barth Corp., 12650 Brookpark Rd., Cleveland, O. *Phone*: Winton 1-1440

Stainless Steel Nuts Reduce Weight



These anchor and gang channel locknuts can be used in temperatures up to 800° F.

Weight savings of the new designs range from 16 to 63 per cent. The nuts meet the needs of electronic equipment and armament systems for aircraft and guided missiles.

Shapes include one and two lug anchor or plate nut shapes. Thread sizes in the anchor line are 6-32, 8-32, 10-32 and ¼-28. All except the 6-32 are available in gang channel nuts. The nuts are used in blind mountings. *Write*: Elastic Stop Nut Corp. of America, 2330 Vauxhall Rd., Union, N. J. *Phone*: Murdock 6-6000

Grinding Compound Is Water Soluble and Transparent

Exceptional rust control is offered by this concentrated chemical solution at dilutions between 1:100 and 1:200. When diluted with water, it forms a colorless, odorless fluid that will not irritate the skin nor turn rancid.

The compound, Cimplus, reacts with steel or cast iron to form a film which cannot be penetrated by air or water.

The low depletion rate of the rust inhibitors gives long-lasting protection in machining cast iron.

Grinding wheels are not loaded by Cimplus. It isn't oily and has good wetting characteristics.

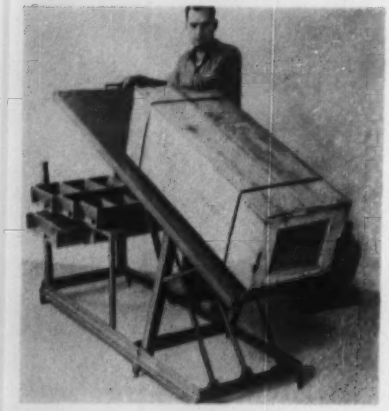
The settling ratio is high enough to prevent grits from recirculating, low enough to avoid clogging of return lines in central systems. The compound is nonflammable. *Write*: Cincinnati Milling Products Division, Cincinnati Milling Machine Co., Cincinnati 9, O. *Phone*: Redwood 1-2121

NEW PRODUCTS and equipment

Packing Bench

Boxes weighing up to 1000 lb can be put on the floor with this packing bench. A hydraulic cylinder allows the operator to tip the load from table to floor with a control lever.

A 3-in. height adjustment can be made to suit the operator. Built-in drawers provide storage space for tools and packing materials. The table is 24 x 72 in.



The cylinder that operates the table needs no power other than the load being handled; a closed hydraulic system controls the tilt of the table through a by-pass operated by a single valve. *Write*: Valley Craft Products Inc., Division of O'Neil-Irwin Mfg. Co., 750 Jefferson Ave., Lake City, Minn.

Tube Cutoff Machine

Up to 2000 pieces an hour can be cut with this rotary unit. Size range: ⅜ to 1½-in. in diameter.

A 7-in. cutoff wheel, rotating at about 300 rpm, descends to contact the tube as the handle is lowered and spins the tube on hardened rollers. The cutting action is through the wall thickness rather than the entire diameter. A ¼-hp gear head motor powers the guard-protected wheel. *Write*: Continental Machine Co., 1952 N. Maud Ave., Chicago 14, Ill. *Phone*: Diversey 8-6596

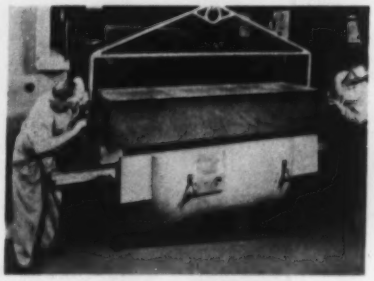
Air Filters

All traces of oil and oil vapors, solid particles over 3 microns in size, odors and moisture are removed by an easily replaceable air filter.

Large quantities of contaminants can be absorbed before the filter needs to be changed. In operation, oil, vapors, moisture and contaminants are diverted around the filter by a top baffle and into a sump at the bottom. *Write*: Wilkerson Corp., Englewood, Colo. *Phone*: Sunset 1-7801

Granite Surface Plates

Diabase (black granite) surface plates have one or more edges finished square with the top surface.



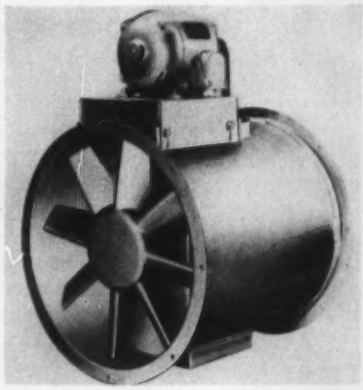
The surface and edges can be lapped either uniformly convex or concave. Diagonals of the plate are the same within 0.0001-in. *Write*: Rahn Granite Surface Plate Co., 641 N. Western Ave., Dayton 7, O. *Phone*: Melrose 1951

Airfoil Fans

New heavy-duty fans have streamlined contours on all surfaces that contact the air stream. A new hub design approximates the motor diameter. It eliminates turbulence over the motor and back flow.

The blade produces an even distribution of air velocity from hub to tip. The blade angles are large at the hub and small at the tip.

Wheels of two, four, six and eight blades meet different pressure and volume requirements.



Fans deliver from 1240 to 102,000 cfm in sizes ranging from 12 to 72 in. Static pressures range from ⅛ to 3½-in. *Write*: Chicago Blower Corp., 9869 Pacific Ave., Franklin Park, Ill. *Phone*: Gladstone 5-4780

Fume Removal

The push-pull system saves heat in removing fumes over plating, anodizing and pickling tanks. A collector or exhaust hood removes fumes. A director supplies a current of air to direct the fumes into it.

The director, a compact air supply unit containing its own motor and blower, will furnish an even air current across a tank surface; tanks 6 ft wide can be ventilated.

Heat is saved because fume removal rates are reduced as much as 75 per cent. Power is saved as smaller fans are needed. Initial costs are less because smaller ducts and stacks can handle the smaller volume of fumes.

Units are easy to install and come in standard sizes. *Write*: Heil Process Equipment Corp., 12901 Elmwood Ave., Cleveland 11, O. *Phone*: Academy 1-6560

Magnetic V-Block

The adjustable V-block is made of alternate laminations of nonmagnetic brass strip and material with high permeability and low residual magnetism. It's used for setting up grinding jobs.

The V-block is set quickly. It

Announcing a

new

UNITED®

Heavy-Duty

ROLLER STRAIGHTENING MACHINE

FOR:

- **RAILS**
- **BEAMS**
- **ANGLES**
- **CHANNELS**
- **TEES ETC.**

United is pleased to offer to the industry a new member of its family of products, the illustrated United-Lamberton Heavy Duty Roller Straightening Machine. This machine was developed and placed in operation by Lamberton & Company, Ltd. of Scotland. The rights to its manufacture were acquired from this company by United, after being thoroughly convinced of its proven value for its intended purpose. As many as 400 tons of rails have been handled on one of these machines in one eight hour shift.

Among the many outstanding advantages of this machine are:

- **Simplicity and Ease of Axial Adjustment and Roll Opening Variations.**
- **The Speed With Which Roll Changes Can Be Made.**
- **Greatly Stepped-Up Finishing of Rail and Structural Products.**

Your inquiry is solicited. Complete details are available without obligation.

UNITED

ENGINEERING AND FOUNDRY COMPANY

Pittsburgh, Pennsylvania

Plants at Pittsburgh • Vandergrift • Youngstown • Canton
Wilmington (Lobdell United Division)

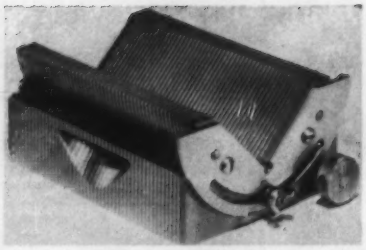
Subsidiaries: Adamson United Company, Akron, Ohio
Stedman Foundry and Machine Company, Inc., Aurora, Indiana

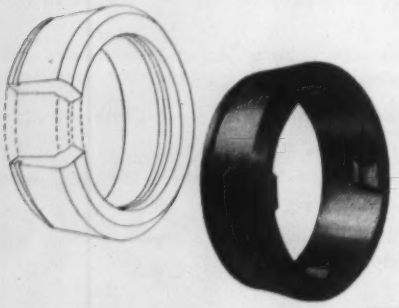
Designers and Builders of Ferrous and Non-Ferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.

can be installed and removed without chuck adjustment.

The V-groove is precision ground to 90 degrees. It's parallel to the base and side of the bottom block to ±0.00005-in. over the entire length. The vernier is graduated to 5 minutes; settings are accurate to 15 seconds.

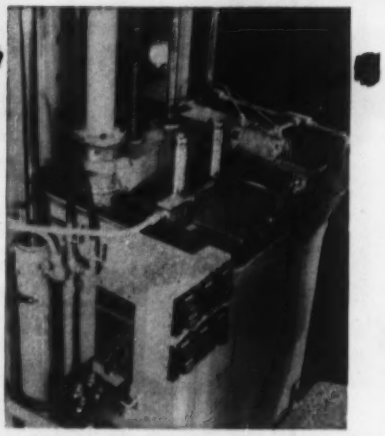
Drill presses and other machines with magnetic chucks can use it. *Write*: Anton Machine Works, 1227 Flushing Ave., Brooklyn 37, N. Y. *Phone*: Hegeman 3-2609





I. D. and four inverted helical splines BROACHED the American way

... 300 parts per hour



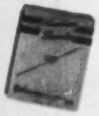
American engineering made this broaching operation fast, automatic and economical.

The finished inside diameter and four inverted helical splines are broached, in this automotive synchronizer ring, two at a time . . . 300 per hour.

American special combination round and spiral spline broaches are used to cut the splines concentric with the I.D.

Feed tubes are here shown as manually loaded but are readily adapted to automation. Parts are fed and ejected by automatic hydraulic slides.

You may have parts that can be produced at significantly lower cost by broaching them the American way. Send part print or sample . . . American engineers will make a recommendation you'll find valuable.



American Catalog 450 is a complete broaching manual . . . write for it today.

American BROACH & MACHINE CO.
A DIVISION OF SUNDSTRAND MACHINE TOOL CO.
ANN ARBOR, MICHIGAN

See American First — for the Best in Broaching Tools, Broaching Machines, Special Machinery

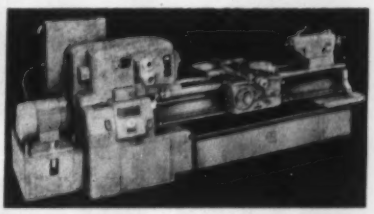
Lathes

Eight lathes have been added to the Series 62 lines. On each model spindle speeds are selected by a dial on the headstock which allows the speed for the next cut to be preselected while the lathe is cutting.

When the spindle is stopped to adjust the cutting tool for the next cut, the headstock gears shift automatically to the preselected speed.

There are 36 spindle speeds in geometric progression—from 14 to 1750 rpm.

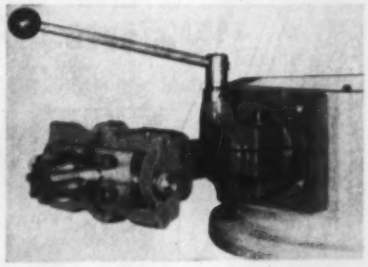
A surface speed dial allows spindle speeds to be selected directly from diameter sizes.



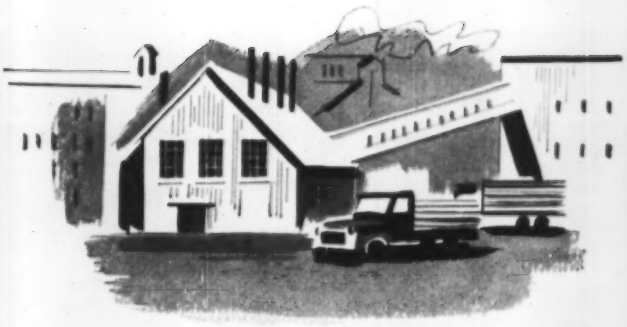
Clearance diameters range from 16 to 28 in. The swing over the cross slide is from 10 to 19 in. The smaller lathes have 10-hp motors, the larger ones, 20 hp. *Write*: Monarch Machine Tool Co., Sidney, O. *Phone*: 2-1381

Tap Holders

Heavy-duty tap holders allow sideways adjustment of the tap to compensate for inaccuracies of turret lathe indexing.



One set of adjustable jaws covers tap squares from ⅞ to 2 in., another from 2 to 3⅛-in. The tap holders also can be mounted in boring mills and radial drill presses. *Write*: E. F. Vilter Co., 4161 N. Richards St., Milwaukee 12, Wis. *Phone*: Edgewood 2-7810



WEIRTON

GALVANIZED SHEETS

for long-lived roofing and siding

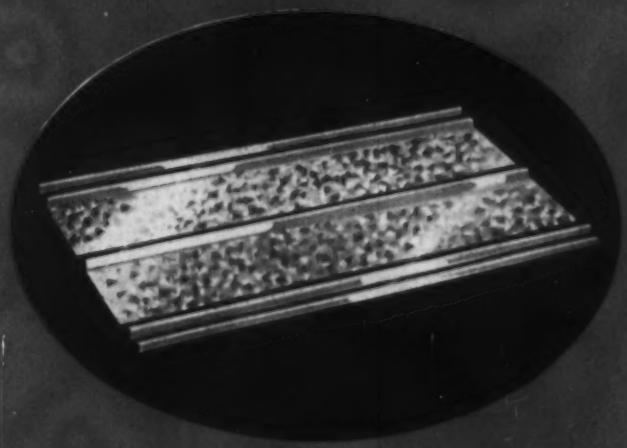
There's an easy way to solve roofing and siding problems quickly, dependably, economically. That's the Weirton way—with Weirton galvanized steel sheets. Their tight zinc coating resists cracking, peeling and flaking. The strength of steel plus the corrosion resistance of zinc gives added years of life. And long experience shows that galvanized sheets give more protection, with less maintenance and at lower cost.

Weirton's modern production processes, plus close quality control all along the line, make Weirton galvanized sheets a best buy for your roofing and siding needs.

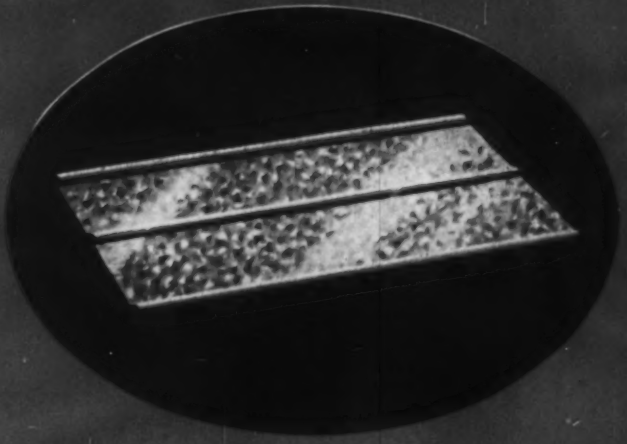
WEIRTON STEEL COMPANY

Weirton, West Virginia

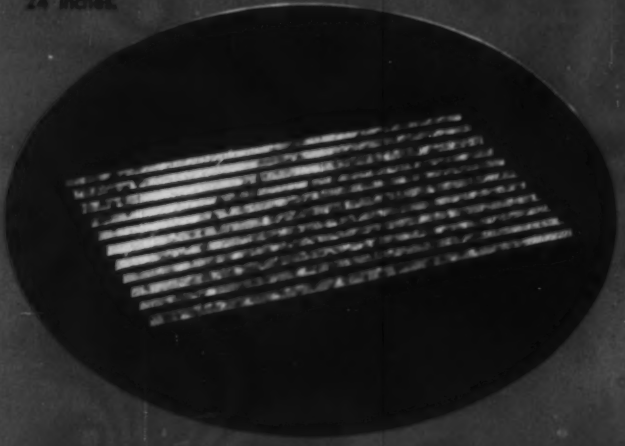
NATIONAL STEEL CORPORATION



Famous Weirton "Safety Drain" galvanized steel sheets combine maximum protection with outstanding good looks.



Weirton galvanized V-Crimp sheets are made in 2V-, 3V-, and 5V-crimped, and in gauges 26, 28 and 29; covering width, 24 inches.



Weirton galvanized corrugated steel sheets are most economical in first cost, and are the strongest form of steel roofing because the corrugations strengthen the entire sheet.

NEW Literature

Write directly to the company for a copy

Instrumentation

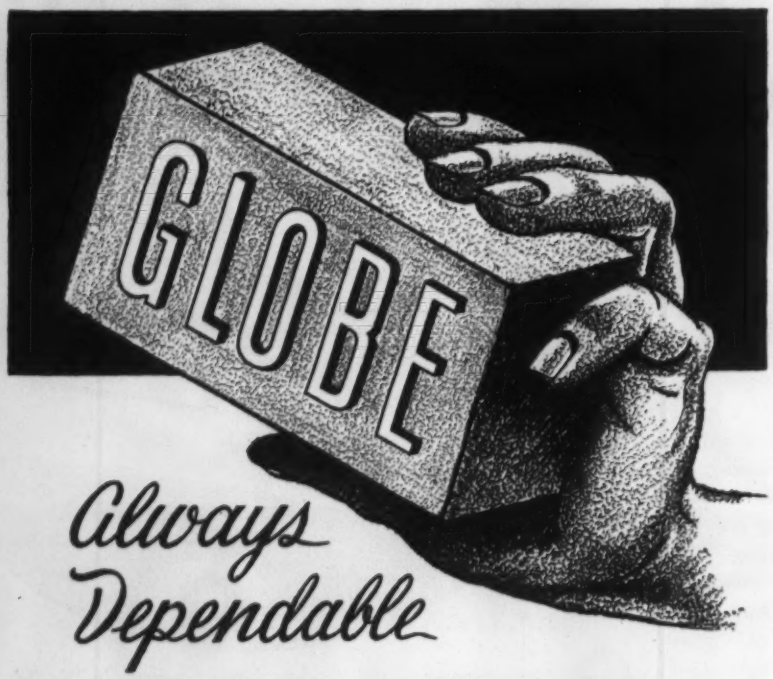
Automatic control and instrumentation, water conditioning and steam testing equipment, chemical feeding devices and chemicals for metal protection are discussed—bulletin GSP-901, 28 pages. Hagan Corp., 323 Fourth Ave., Pittsburgh 30, Pa.

Notching Presses

Press and fixture specifications for notching machines, segment notchers, a slotting machine and a band punching machine are detailed—catalog 55, 16 pages. V & O Press Co., division of Emhart Mfg. Co., Hudson, N. Y.

Contour Projectors

Detailed descriptions of six projectors are given, and the use of optical gaging is discussed—12 pages. Special Products Sales Division, Eastman Kodak Co., 343 State St., Rochester, N. Y.



Always Dependable

SUPERIOR LADLE BRICK

The greater heat resistance of GLOBE brick is well known in the steel industry. Because these bricks, wire cut or dry pressed, last longer—saving much time lost in refractory replacement—they help increase melting capacity. There is a type for every need, so let us place our experience at your disposal.

Lowers Per Ton Cost and Increases Melting Capacity

SERVING THE STEEL INDUSTRY SINCE 1873

The GLOBE BRICK Co.
EAST LIVERPOOL, OHIO

Plant Ventilators

Technical data are given for power roof, continuous ridge and round gravity ventilators—4 pages. American Steel Band Co., P. O. Box 565, Pittsburgh 30, Pa.

Thread Grinders

Automatic units for grinding external threads are described—bulletin 481051, 8 pages. Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich.

Grinding Wheels

This booklet tells how to select wheels to precision grind tool and construction steels—22 pages. Norton Co., Worcester 6, Mass.

Plastic Pipe

Rigid polyvinyl chloride pipe, its properties and installation features are covered—bulletin 24, 28 pages. National Tube Division, U. S. Steel Corp., 525 William Penn Place, Pittsburgh 30, Pa.

Triple-Action Press

Design features of presses with fast advance, slow draw and fast return are given—4 pages. Hamilton Press Division, Baldwin-Lima-Hamilton Corp., Hamilton, O.

Tracer Lathes

Specifications and typical jobs of high production lathes are covered—bulletin HDT-55, 4 pages. Hydra-Feed Machine Tool Corp., 730 W. Eight Mile Rd., Ferndale, Mich.

Gear Checking

Machines and equipment for checking external, internal and helical gears are described—catalog C55-9, 16 pages. National Broach & Machine Corp., 5600 St. Jean Ave., Detroit 13, Mich.

Machine Tool Drives

Special and standard motors and adjustable speed drives for the machine tool industry are described—bulletin 1750. Louis Allis Co., Milwaukee 7, Wis.

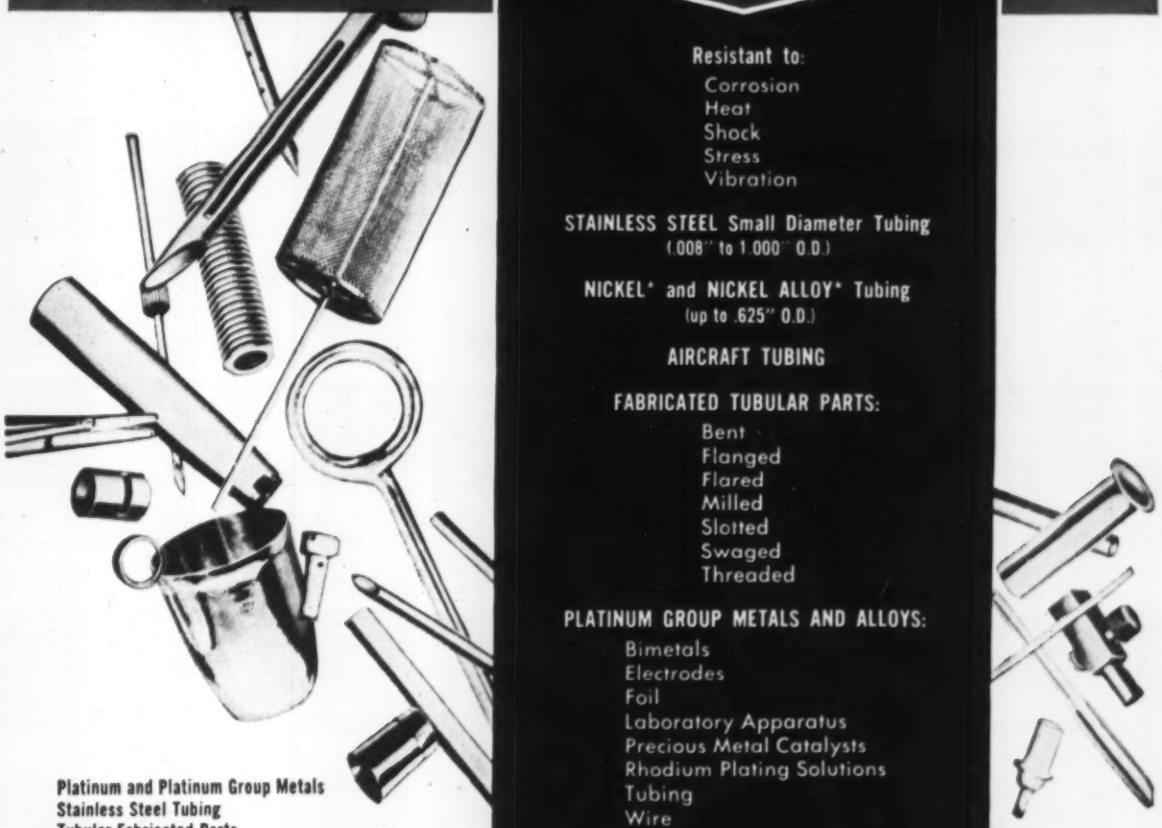
Alloy Steels

Two low-alloy, high-strength steels are described—from raw materials to engineering properties — 32 pages. Sheffield Steel Division, Armco Steel Corp., Houston, Tex.

Materials Handling

Here are technical data on vibratory equipment, feeders, conveyors, power tools, shaft seals and electric hammers—catalog 5510, 50 pages. Syntron Co., 370 Lexington Ave., Homer City, Pa.

For Precision use BISHOP



Platinum and Platinum Group Metals
Stainless Steel Tubing
Tubular Fabricated Parts
Spinnerettes
Hypodermic Needles and Syringes

Resistant to:
Corrosion
Heat
Shock
Stress
Vibration

STAINLESS STEEL Small Diameter Tubing
(.008" to 1.000" O.D.)

NICKEL* and NICKEL ALLOY* Tubing
(up to .625" O.D.)

AIRCRAFT TUBING

FABRICATED TUBULAR PARTS:
Bent
Flanged
Flared
Milled
Slotted
Swaged
Threaded

PLATINUM GROUP METALS AND ALLOYS:
Bimetals
Electrodes
Foil
Laboratory Apparatus
Precious Metal Catalysts
Rhodium Plating Solutions
Tubing
Wire

RESEARCH, ENGINEERING
AND DEVELOPMENT SERVICES

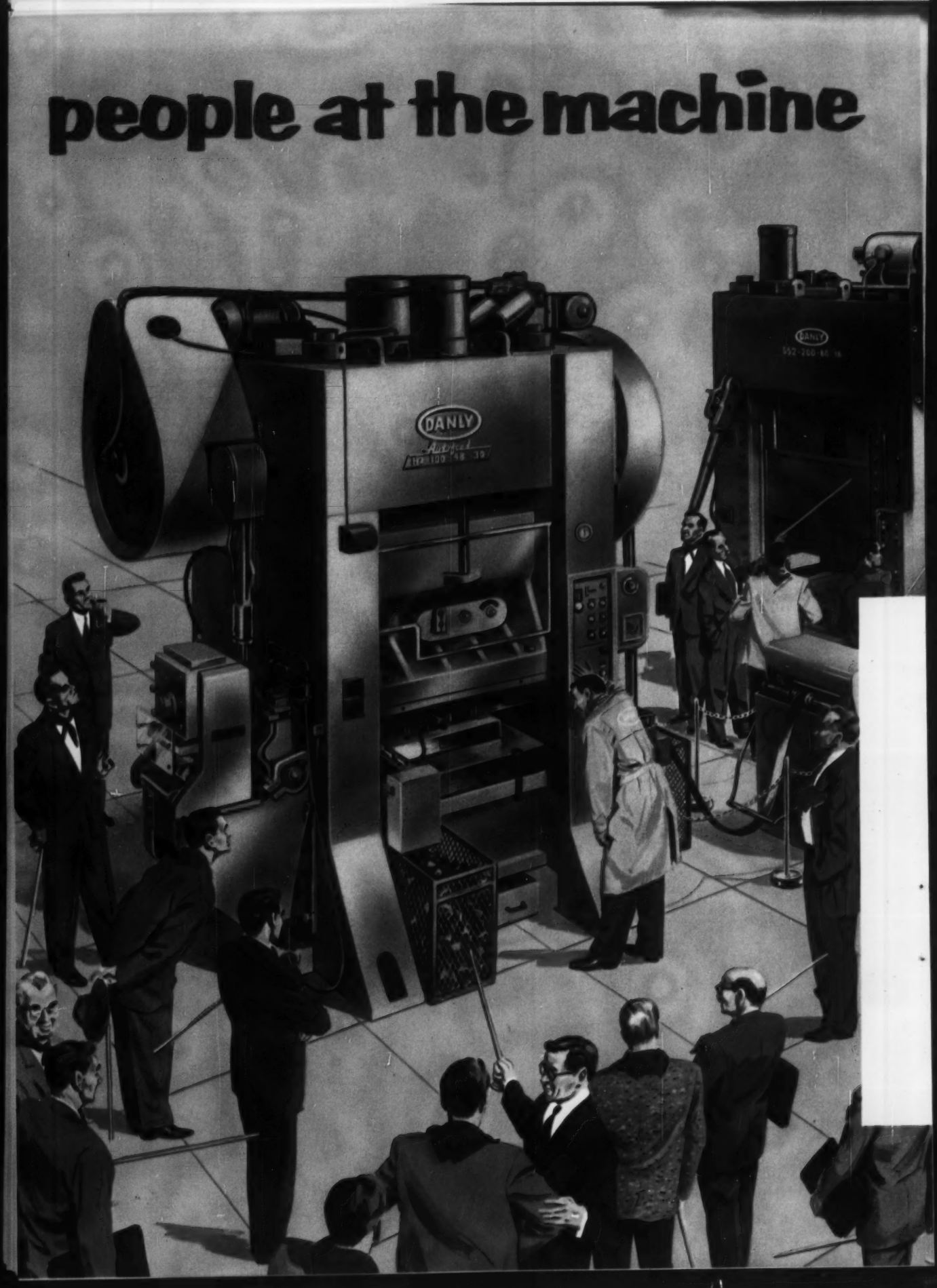
METALS

J. BISHOP & CO. PLATINUM WORKS
Malvern, Pennsylvania
Serving Science and Industry Since 1842

Plants at Malvern, Pa., Fraser, Pa., Vineland, N. J. and Southern Pines, N. C.
Visit Bishop's Booth 809, at the Twenty-Fifth Exposition of Chemical Industries, Convention Hall, Philadelphia, Pennsylvania, December 5-9, 1955

* Trademark International Nickel Company

people at the machine



tool show compared

...AND SAW WHY

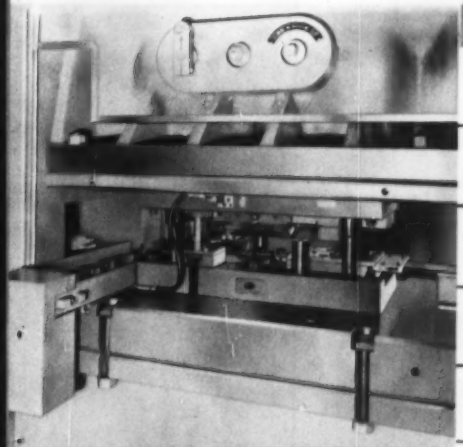
IT COSTS LESS TO RUN A DANLY PRESS

Manufacturers, engineers, machine tool users and industrial leaders from all parts of the world watched Danly Presses and equipment operate at the Machine Tool Show in Chicago. They saw working demonstrations of Danly operational features . . . inspected advanced Danly design and construction . . . found out first-hand *why* increased production costs less with Danly Presses.

The Danly Autofeed Press exhibited represents the most advanced thinking in high-speed stamping press design . . . duplicating the actual results *you* can expect in your own plant. Vibration-resistant construction, built-in press controls, operator and press safety devices built into this press result in direct savings in maintenance and operating costs. Machine tool precision and substantially heavier construction throughout are basic reasons why Danly Autofeed Presses will give you greater production from your progressive dies . . . why this exhibition press turned out stampings from a seven station die at the rate of over 3,000,000 per month. This figure represents the number of rifle clips actually being produced, month after month, in a production plant from an identical die on a similar Autofeed Press.

These same Danly advantages will produce substantial savings in your operations. Use the comparison list shown here to check Danly Presses, feature for feature, against all other presses. *Discover for yourself why Danly Presses mean* increased production at lower operating costs. Talk to a Danly engineer *soon. Write for the completely new Danly Autofeed Press Catalog now!*

WHY DON'T YOU COMPARE DANLY PRESSES, FEATURE FOR FEATURE, WITH ALL OTHER PRESSES ON THE MARKET?

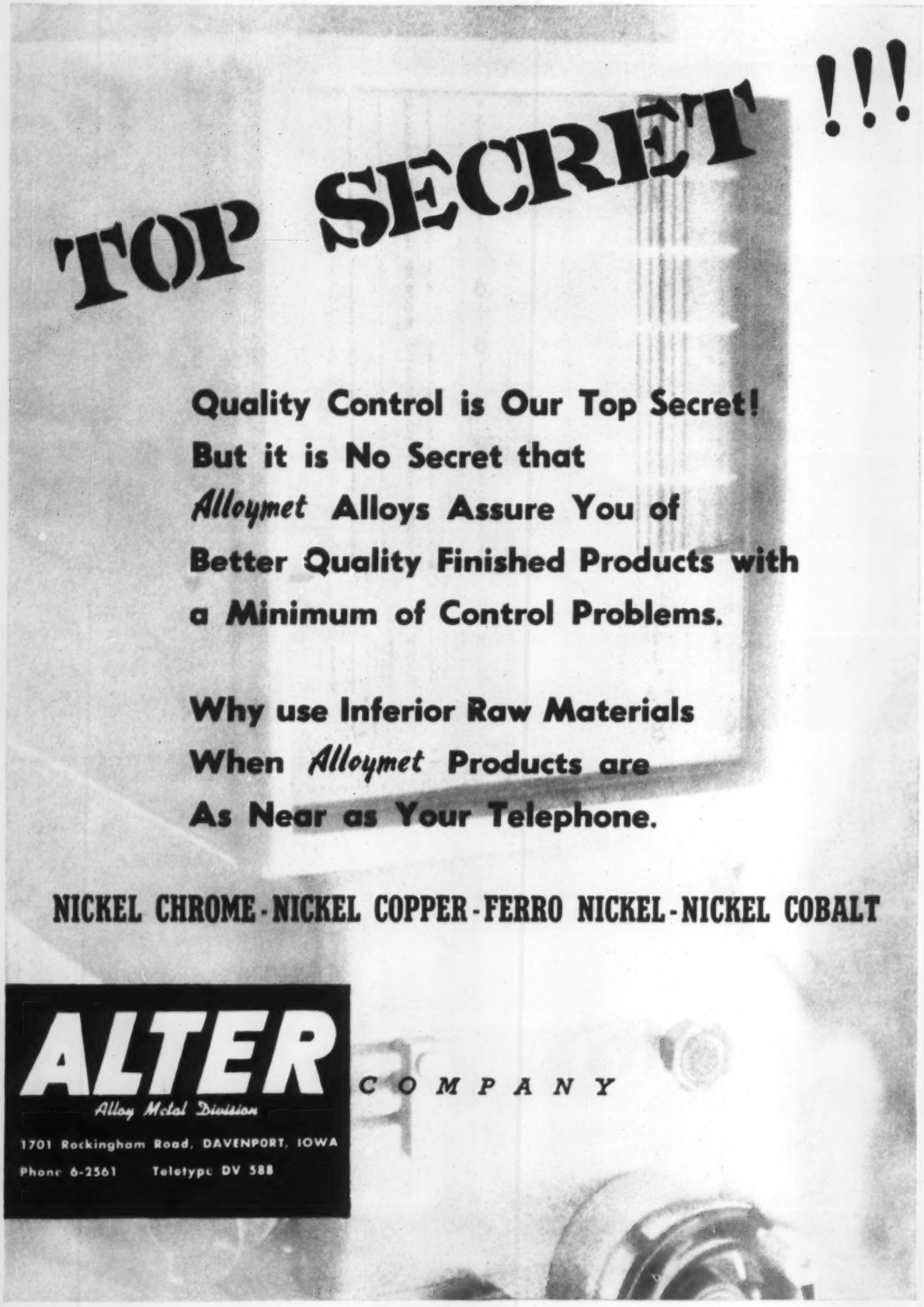


THIS IS THE SEVEN STAGE PROGRESSIVE DIE THAT PRODUCES RIFLE CLIPS AT THE RATE OF OVER 3,000,000 A MONTH. EXTREMELY CLOSE ALIGNMENT OF OIL LUBRICATED SLIDE GIBS AND EXTRA-RIGID CONSTRUCTION OF DANLY PRESSES PROTECT DIES SUCH AS THIS, ASSURING LONGER LIFE.

COMPARE	FEATURE	DANLY	OTHER	
PRECISION	Machine tool precision in manufacture and assembly plus adequate lubrication assure smoother operation, longer life.	✓		
INSTALLATION COSTS	Danly presses are delivered already "run-in" tested. Assembly and operation in the Danly plant means fewer adjustments, faster installation.	✓		
DRIVE	Danly's cool-running clutch lasts longer. Herringbone type gears and anti-friction bearings on high speed shafts wear longer.	✓		
CONSTRUCTION	Extra-heavy construction reduces vibration and deflection. Dies last longer, presses stand up under severest duty.	✓		
LUBRICATION	Danly features completely automatic oil lubrication including slide gibs. Should any vital bearing not be sufficiently lubricated, safety switch stops press and indicates the source of trouble.	✓		
MAINTENANCE	Performance records in the country's biggest stamping shops prove that Danly Presses require less maintenance, greatly reduce spare part needs.	✓		
CONTROLS	Controls designed and built by the press manufacturer assure the user of undivided, one-source responsibility for control and press performance on the production line.	✓		

DANLY®

DANLY MACHINE SPECIALTIES, INC.
2100 South Laramie Avenue · Chicago 50, Illinois


TOP SECRET !!!
Quality Control is Our Top Secret!
But it is No Secret that
Alloymet Alloys Assure You of
Better Quality Finished Products with
a Minimum of Control Problems.
Why use Inferior Raw Materials
When Alloymet Products are
As Near as Your Telephone.
NICKEL CHROME - NICKEL COPPER - FERRO NICKEL - NICKEL COBALT
ALTER
Alloy Metal Division
COMPANY
1701 Rockingham Road, DAVENPORT, IOWA
Phone 6-2561 Teletype DV 588

STEEL

November 28, 1955

Market Outlook

PRESSURE for steel price increases showed itself with a $6-to-$20-a-ton rise in price extras on two structural items made by Jones & Laughlin Steel Corp., Pittsburgh. The increases, effective Nov. 21, were on junior beams and junior channels, made exclusively by J & L.

IN LINE— The median of those increases is $13. STEEL (Nov. 14, p. 59) said steel prices might go up $12 a ton by next July, with the probabilities that the rises would come piecemeal and on selected products—the least profitable ones.

Structurals are not the most profitable of finished steel products. Because of the heavy volume of construction, structural demand has been outrunning supply.

BARS UP—Base prices on rail steel merchant bars were raised $2 a ton by Calumet Steel Division (Chicago Heights, Ill.) and the Franklin Steel Division (Franklin, Pa.) of Borg-Warner Corp., and by Inland Steel Co. (Chicago Heights, Ill., plant). Rail steel merchant bars are now 4.65 cents a pound, the same as new billet steel merchant bars.

IMPORTS RISE—If you use foreign steel, you'll have to pay more. Import prices on most major steel products from Western Europe are up $2 to $11 a ton. The $11 increase is on hot-rolled carbon sheet, a product hard to get domestically. Not only is demand heavy but the narrow profit margin on it influences producers to divert their steel into more profitable items, such as cold-rolled sheets. Also reflecting the heavy demand and low profit in the domestic market is the price of imported steel plate. It is $50 a ton over plate produced in the U. S.

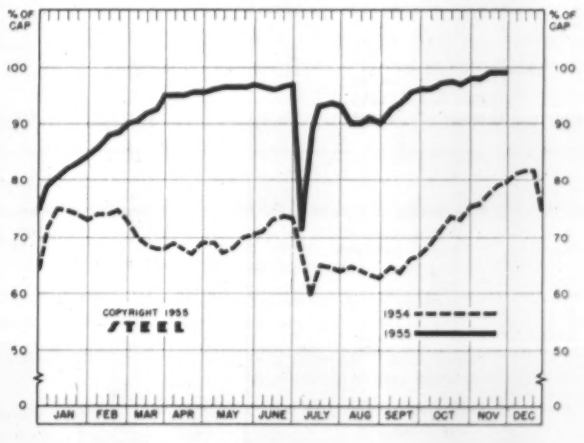
Higher prices are cropping out in the scrap market, too. STEEL's price composite on steelmaking scrap rose in the week ended Nov. 23 to $46.33 a gross ton—highest level since January, 1951, the Korean War period. The latest increase was 66 cents a ton and marked the fourth consecutive week of rise.

NEAR THE TOP—Steel producers in the week ended Nov. 27 were able to maintain their ingot operations at 99 per cent of capacity for the third consecutive week. They've now turned out more steel than in any year except record-breaking 1953. Output now totals 105,530,000 net tons of steel for ingots and castings, exceeding 1951's 105,199,848 tons. If production can be sustained at current levels, the 1953 record of 111,609,719 tons will be eclipsed at mid-December.

AFTERTHOUGHT— The heavy demand for steel is influencing consumers to make the most of government ratings. Some are endeavoring to apply ratings to tonnage to compensate for steel laid in earlier this year. These are cases where ratings were applicable but not used because of the freer supply of steel then. Result: Producers are carefully scrutinizing all requests for rated tonnage.

PRESSING—Railroads are pressing for car steel, and are receiving some political backing. A U. S. representative from West Virginia, in a letter to the American Iron & Steel Institute, urges steel producers to step up shipments so that 8000 to 10,000 freight cars can be built a month, double the present rate.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended Nov. 27	Change	Same Week 1954	Same Week 1953
Pittsburgh	103	+ 1*	77.5	77
Chicago	98	— 1*	90	96.5
Mid-Atlantic	98	0	72	90
Youngstown	100	0	83	93
Wheeling	101	+ 1	79.5	78
Cleveland	100	0*	86	98
Buffalo	105	0	97.5	99.5
Birmingham	94	— 0.5	64	96.5
New England	90	0	58	85
Cincinnati	92.5	0	75.5	67.5
St. Louis	109.5	+ 10	82	98
Detroit	95	— 3	80	97.5
Western	99	0	83	93
National Rate	99	0	79.5	87.5

INGOT PRODUCTION‡

	Week Ended Nov. 27	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	148.7†	149.0	150.2	119.2
NET TONS (In thousands)	2,389†	2,394	2,413	1,915

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,413,278 in 1955; 2,384,549 in 1954; 2,254,459 in 1953.

Metalworking Outlook—p. 59 Technical Outlook—p. 97

Price Indexes and Composites

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	Nov. 22 1955	Nov. 15 1955	Month Ago	Oct. Average
(1947-1949=100)	154.5	154.5	154.5	154.5

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Nov. 22

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parenthesis. For complete description of the following products and extras and deductions applicable to them write to STEEL.

Rails, Standard, No. 1	$4.800	Sheets, Electrical	$10.206
Rails, Light, 40 lb	6.217	Strip, C.R., Carbon	7.993
Tie Plates	5.625	Strip, C.R., Stainless, 430 (lb)	0.444
Axles, Railway	8.000	Strip, H.R., Carbon	5.350
Wheels, Freight Car, 33 in. (per wheel)	52.50	Pipe, Black, Buttweld (100 ft)	16.366
Plates, Carbon	4.950	Pipe, Galv., Buttweld (100 ft)	19.971
Structural Shapes	4.867	Pipe, Line (100 ft)	158.925
Bars, Tool Steel, Carbon (lb)	0.460	Casing, Oil Well, Carbon (100 ft)	165.120
Bars, Tool Steel Alloy, Oil Hardening Die (lb)	0.560	Casing, Oil Well, Alloy (100 ft)	244.670
Bars, Tool Steel, H.R., Alloy, High Speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.185	Tubes, Boiler (100 ft)	39.470
Bars, Tool Steel, H.R. Alloy, High Speed W-18, Cr 4, V 1 (lb)	1.680	Tubing, Mechanical, Carbon	20.980
Bars, H.R., Alloy	9.375	Tubing, Mechanical, Stainless, 304 (100 ft)	178.897
Bars, H.R., Stainless, 303 (lb)	0.450	Tin Plate, Hot-dipped, 1.25 lb	8.933
Bars, H.R., Carbon	5.350	Tin Plate, Electrolytic, 0.25 lb	7.633
Bars, Reinforcing	5.313	Black Plate, Canmaking Quality	6.733
Bars, C.F., Carbon	8.660	Wire, Drawn, Carbon	8.575
Bars, C.F., Alloy	12.175	Wire, Drawn, Stainless 430 (lb)	0.578
Bars, C.F., Stainless, 302 (lb)	0.468	Bale ties (bundle)	6.473
Sheets, H.R. Carbon	5.145	Nails, Wire, 8d Common	8.618
Sheets, C.R., Carbon	6.239	Wire, Barbed (80-rod spool)	7.847
Sheets, Galvanized	7.690	Woven Wire Fence (20-rod roll)	18.635
Sheets, C.R., Stainless, 302 (lb)	0.588		

STEEL's FINISHED STEEL PRICE INDEX*

	Nov. 23 1955	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	208.90	208.90	208.90	194.53	157.76
Index in cents per lb	5.659	5.659	5.659	5.270	4.274

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT*	$128.14	$128.14	$128.14	$117.95	$95.09
No. 2 Fdry, Pig Iron, GT	58.99	58.99	58.99	56.54	49.54
Basic Pig Iron, GT	58.49	58.49	58.49	56.04	49.04
Malleable Pig Iron, GT	59.77	59.77	59.77	57.27	50.27
Steelmaking Scrap, GT	46.33	45.67	45.00	33.08	41.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Nov. 23 1955	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.65	4.65	4.65	4.30	3.45
Bars, H.R., Chicago	4.65	4.65	4.65	4.30	3.45
Bars, H.R., deld. Philadelphia	4.90	4.90	4.90	4.55	3.93
Bars, C.F., Pittsburgh	5.90	5.90	5.90	5.40	4.15
Shapes Std., Pittsburgh	4.60	4.60	4.60	4.25	3.40
Shapes, Std., Chicago	4.60	4.60	4.60	4.25	3.40
Shapes, deld., Philadelphia	4.88	4.88	4.88	4.53	3.46
Plates, Pittsburgh	4.50	4.50	4.50	4.225	3.50
Plates, Chicago	4.50	4.50	4.50	4.225	3.50
Plates, Coatesville, Pa.	4.80	4.80	4.80	4.225	3.90
Plates, Sparrows Point, Md.	4.50	4.50	4.50	4.225	3.50
Plates, Claymont, Del.	4.80	4.80	4.80	4.225	3.90
Sheets, H.R., Pittsburgh	4.325	4.325	4.325	4.05	3.35
Sheets, H.R., Chicago	4.325	4.325	4.325	4.05	3.35
Sheets, C.R., Pittsburgh	5.325	5.325	5.325	4.95	4.10
Sheets, C.R., Chicago	5.325	5.325	5.325	4.95	4.10
Sheets, C.R., Detriot	5.325-5.425	5.325-5.425	5.325-5.425	5.10	4.30
Sheets, Galv., Pittsburgh	5.85	5.85	5.85	5.45	4.40
Strip, H.R., Pittsburgh	4.325	4.325	4.325	4.05	3.50-3.75
Strip, H.R., Chicago	4.325	4.325	4.325	4.05	3.25
Strip, C.R., Pittsburgh	6.25	6.25	6.25	5.75	4.15-4.85
Strip, C.R., Chicago	6.35	6.35	6.35	6.00	4.30
Strip, C.R., Detroit	6.35	6.35	6.35	5.60-5.90	4.35-5.10
Wire, Basic, Pittsburgh	6.25	6.25	6.25	5.75	4.50-4.75
Nails, Wire, Pittsburgh	7.60	7.60	7.60	6.85	5.30-5.60
Tin plate (1.50 lb), box, Pitts.	$9.45	$9.45	$9.45	$9.05	$7.50
SEMIFINISHED STEEL					
Billets, Forging, Pitts. (NT)	$84.50	$84.50	$84.50	$78.00	$63.00
Wire rods, $\frac{7}{32}$-$\frac{9}{32}$" Pitts.	5.025	5.025	5.025	4.675	3.85
PIG IRON, Gross Ton					
Bessemer, Pitts.	$59.50	$59.50	$59.50	$57.00	$50.00
Basic, Valley	58.50	58.50	58.50	56.00	49.00
Basic, deld. Phila.	62.16	62.16	62.16	59.66	53.39
No. 2 Fdry, Pitts.	59.00	59.00	59.00	56.50	49.50
No. 2 Fdry, Chicago	59.00	59.00	59.00	56.50	49.50
No. 2 Fdry, Valley	59.00	59.00	59.00	56.50	49.50
No. 2 Fdry, deld. Phila.	62.66	62.66	62.66	50.16	53.89
No. 2 Fdry, Birm.	55.00	55.00	55.00	52.88	45.88
No. 2 Fdry (Birm.) deld. Cin.	62.70	62.70	62.70	60.58	52.58
Malleable, Valley	59.00	59.00	59.00	56.50	49.50
Malleable, Chicago	59.00	59.00	59.00	56.50	49.50
Ferromanganese, Duquesne	190.00†	190.00†	190.00†	190.00†	175.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pitts.	$45.50	$45.50	$44.50	$33.50	$44.00
No. 1 Heavy Melt, E. Pa.	48.00	47.00	46.50	32.25	39.00
No. 1 Heavy Melt, Chicago	45.50	44.50	44.00	33.50	40.00
No. 1 Heavy Melt, Valley	48.00	48.00	48.00	34.50	43.75
No. 1 Heavy Melt, Cleve.	45.50	45.50	45.50	32.50	43.25
No. 1 Heavy Melt, Buffalo	43.50	43.50	38.50	31.50	41.50
Rails, Rerolling, Chicago	66.50	66.50	65.50	54.50	64.50
No. 1 Cast, Chicago	48.50	47.50	47.50	39.50	59.00
COKE, Net Ton					
Beehive, Furn, Connisvl.	$13.625	$13.625	$13.625	$13.75	$14.25
Beehive, Fdry, Connisvl.	16.50	16.50	16.50	16.75	16.50
Oven, Fdry, Chicago	25.75	25.75	25.75	24.50	21.00

Daily Nonferrous Price Record

	Price Nov. 23	Last Change	Previous Price	Oct. Avg.	Sept. Avg.	Nov. 1954 Avg.
Copper	43.00-46.50	Oct. 17, 1955	43.00-46.00	44.594	45.380	30.000
Lead	15.30	Sept. 26, 1955	14.80	15.300	14.920	14.800
Zinc	13.00	Oct. 21, 1955	13.00-13.50	13.020	12.940	11.500
Tin	98.875	Nov. 22, 1955	98.75	96.230	96.565	91.196
Nickel	64.50	Nov. 24, 1954	60.00	64.500	64.500	60.000
Aluminum	24.40	Aug. 8, 1955	23.20-24.40	24.400	24.400	22.200
Magnesium	32.50	Aug. 16, 1955	28.50	32.500	32.500	27.000

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld, New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, 99.8%, Freeport, Tex.

What You Can Use the Markets Section for:

- **A source of price information.**
  Current prices are reported each week. Price changes are shown in italics. Price trends are shown in tables of indexes and comparisons.
- **A directory of producing points.**
  Want to know who makes something, or where it is made? The steel price tables alphabetically list the cities of production and indicate the producing company. If you are a buyer, you may want to make a map showing comparative distances of sources of supply and to help you compute freight costs. If you are a seller of supplies you can make a map to spot your sales possibilities.
- **A source of price data for making your own comparisons.**
  Maybe you want to keep a continuous record of price spread between various forms of steel. You can get your base price information from STEEL's price tables.
- **A source of information on market trends.**
  Newsy items tell you about the supply-demand situation of materials, including iron and steel, nonferrous metals and scrap. Other articles analyze special situations of interest and importance to you.
- **Reports on iron and steel production, and materials and product shipments.**

why STAINLESS STEEL TUBING?

Selection of the proper grade of stainless steel tubing is essential because no single metal or alloy economically resists all corrosive conditions. As certain physical properties are required for specific applications, sometimes the consideration of corrosion resistance is neglected when the choice of tubing material is made. For example, if a degree of corrosion resistance can be imparted to ordinary steel by the use of a protective coating, and if replacement cost of the article is low, this may be the sensible course.

But where replacement cost is high, or where contamination through corrosion may occur, the wisest, and in the long run the most economical choice of tubing, is a stainless steel of the correct analysis for the conditions of manufacture and service.

Get in touch with Mr. Tubes, your link to B&W, for a detailed comparison of grades suitable for your use and learn how to get more for your money with stainless. *Or write for Bulletin TDC-160S.*

B&W
TUBULAR PRODUCTS DIVISION

THE BABCOCK & WILCOX COMPANY
TUBULAR PRODUCTS DIVISION
Beaver Falls, Pa. and Milwaukee, Wis.: Seamless Tubing, Welded Stainless Steel Tubing
Alliance, Ohio: Welded Carbon Steel Tubing
Milwaukee, Wis.: Seamless Welding Fittings

TA-5037(P)

Nonferrous Metals

If copper mines could produce at current levels for the next 12 months, the shortage could be over. Labor and market price hold the trump cards to high-level production

Nonferrous Metal Prices, Pages 140 & 141

STATISTICS released by the Copper Institute, New York, show that domestic and foreign crude production of the red metal hit all-time highs in October.

Results — Domestic production of crude was 100,208 tons, with secondary production registering 9863 tons. Foreign crude production totaled 145,462 tons, with secondary production reaching 1160 tons.

Meanwhile, domestic deliveries to fabricators dipped from 144,571 tons in September to 133,946 tons in October. In the foreign market, deliveries fell from 117,547 tons to 112,952 tons.

While there are indications that demand could outstrip supply for some time to come, there are other facts which keep pointing to a somewhat more normal copper supply.

Food for Thought — By projecting second quarter production of U. S. crude (313,761 tons) as the annual rate and adding 300,000 tons of imports, a total of some 1,555,044 tons of copper might have been produced this year. Industry estimates indicate that some 1,560,000 tons will be consumed. This would leave a deficit of at least 4956 tons.

Then came the change: The copper price, which averaged 36 cents a pound during the second quarter, began to climb to its present primary level of 43 cents a pound. Taking the October domestic production rate and projecting it as an annual rate figure (with the addition of 300,000 tons for imports), total available copper climbs to 1,620,852 tons—at 43 cents a pound. If the consumption rate would remain about the same for the next 12 months, 1,560,000 tons could be subtracted from the new total, leaving 60,852 tons left over at the end 1956.

Dreaming?—To have this much copper, there would have to be complete labor harmony, stockpile requirements would have to be low or even deferred and prices would have to remain at current levels, so that fringe producers would keep mines in operation.

The government has given a positive indication that it feels the copper situation may be coming into line. The Copper Division, Business & Defense Services Administration, has amended order M-11A. This change increases the mill space to be reserved for production of copper-base materials. The total reserve set by BDSA will be 116 million lb during the first quarter of 1956. This is an 8-million-lb increase over the third and fourth quarters of 1955.

Mill space reserved for alloyed brass mill plate, sheet, strip and rolls shows increases of 2 per cent for each. Rod, bar, shapes and wire are being increased from 5 to 8 per cent.

The 116 million lb reserved for next quarter will meet orders of the Defense department, AEC and defense-related B products.

Crux—The government must feel that copper supplies are returning to normal, or it would not have taken steps to increase copper setasides at this time.

Crude Copper Production Hits New Peak

(in tons)

	Domestic		Foreign	
	Primary	Secondary	Primary	Secondary
Oct.	100,208	9,863	145,462	1,160
Sept.	96,343	12,739	140,606	1,049
Aug.	67,990	9,364	127,405	774
July	31,846	7,614	135,900	765
June	90,645	11,295	141,413	603
May	95,042	11,731	134,732	574

Source: Copper Institute

U.S. Studies Nickel

Nickel users are being investigated. In an effort to stem any desire by users to abuse the Defense Materials System setup on nickel, BDSA is investigating all rated orders placed for November melting or processing.

BDSA explains that letters have been sent to all melters and processors asking for detailed information concerning all defense-rated orders for nickel-bearing materials which will be produced this month. Answers will be sent in by Dec. 1.

Each company must provide: Customer's names; order numbers; defense contract numbers, if available; defense order ratings; products; grades; per cent nickel content; shipped weight of products; and the amount of nickel ordered from suppliers to fill orders.

In a separate letter to users of nickel and nickel products, BDSA directs attention to the regulations and orders pertaining to the use of priority ratings. It points out that these regulations will be "of particular interest to companies extending ratings for nickel to be consumed in electroplating and for replenishment of warehouse stocks."

Nickel users also have been informed that this is the first of a series of checks to be sure that there is compliance with DMS orders. It will also help BDSA to measure the effectiveness of the materials system.

Aluminum: Records Fall

Aluminum production has outdone itself again. For the sixth time this year, the Aluminum Association, New York, reports that a record has been set. Aluminum production in October reached 269,312,211 lb. Previous all-time high was August, when over 267 million lb were produced. October totals were more than 8 million lb ahead of September, 1955, and jumped more than 28 million lb ahead of the totals registered in September, 1954.

BRIDGEPORT BRASS COMPANY

COPPER ALLOY BULLETIN

Bridgeport Brass Co.

Reporting new developments in copper-base alloys and metalworking methods.

Solid Brass Fireplace Equipment Gives Beauty More Than Skin Deep

Simple decorating trends, calling for warm, rich color accents, are enhanced by solid brass fireplace equipment in modern homes. For high quality fireplace fixtures such alloys as Bridgeport Yellow Sheet Brass have added advantages in ease of fabrication.

Wilshire Manufacturing Co., of Los Angeles, large producer of quality fireplace screens and accessories, asked Bridgeport Technical Service to recommend alloys that would meet Wilshire's rigid product requirements and still work satisfactorily in widely varied manufacturing operations. Specifications were reviewed from standpoints both of production and the basic objectives—quality products with good color characteristics and bright, enduring finish.

To achieve top quality an alloy of uniform fine grain structure was specified. Comprehensive tests established Bridgeport Yellow Brass Sheet as meeting every requirement. Variations in temper were recommended to facilitate the many different forming operations.

An important factor was that the sharpness of intricate filigree patterns used on firescreens and stands depends upon exact, uniform metal tempers. Excessive hardness dulls tools; softness causes ragged patterns and increases the number of rejected pieces.

Ductility proved essential in stamping firescreen feet, a process which stretches as well as compresses metal. Alloys must not crack, tear or fail on the sharp bends.

Wilshire has made wire weaving a fine art by developing a unique process which produces attractive, flexible screening. Here too, product quality was found to depend largely on the physical characteristics of the wire—proper tempering, dimensional accuracy and consistent conformity with manufacturer's specifications.

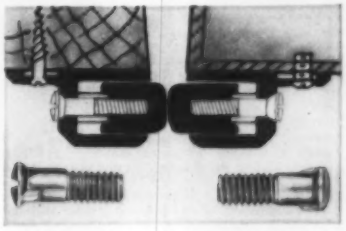
Product and production studies like these, made by Bridgeport's metal experts over the complete range of Wilshire's operations, resulted in specialized metallurgical recommendations covering all phases of manufacturing and materials requirements. In every case the Bridgeport alloys were exactly suited to Wilshire's varying production techniques for manufacturing wood baskets, shovels, screens, frames, legs, handles, and filigreed parts. In addition, Wilshire benefits from Bridgeport's pre-shipment materials inspection and quality control.

Any manufacturer looking for practical ways of maintaining, or improving product quality, can call on Bridgeport's Technical Service for experienced advice. Local Bridgeport offices make all the arrangements.

Corrosion-Resistant Silicon—Bronze Screws Help Astragals to Exclude Wind and Weather

Physical properties of small parts can make big differences in the satisfactory service of assembled products.

Typical are the specially made screws of Bridgeport Silicon Bronze in adjustable astragals fitted to doors as weather strips and stop beads. Despite wear, weather, expansion and contraction, they enable flexible weatherstrip edges to exclude dirt, dust and drafts.



These screws are cold-headed by Time Screw & Manufacturing Corp., of Rockford, Ill., and are installed in extruded bronze astragals made by The Michaels Art Bronze Co., Covington, Ky.

All types of exterior doors must close tightly against weather and drafts. Adjustment must be easy when necessary. All materials must resist corrosion.

The screws, spaced 10 inches apart on a flexible edge held on the fixed member, have oval heads with two small lugs. The lugs, meshing into grooves in the fixed member, prevent vibration and loosening as the screws tension the edge against a steel spring.

Cold-headed from Bridgeport Silicon Bronze 609, these screws exemplify careful materials selection, matched with physical and end-use requirements. Physical properties of 609 satisfy severest demands. Cold-working properties simplify machining, reduce production cost.

Possessing the strength and toughness of mild steel and highly resistant to corrosion, 609 is approximately 98% copper and 2% silicon. This alloy is well suited to exposed installations.

When physical requirements are critical, Bridgeport alloys such as Silicon Bronze 609 often are recommended. These alloys can meet your production requirements, reduce manufacturing costs and contribute to greater product quality. (4388)

Bridgeport Brass Co.

BRIDGEPORT BRASS COMPANY ◆ BRIDGEPORT, CONNECTICUT

Mills at Bridgeport, Conn., Indianapolis, Ind., and Adrian, Mich. Sales Offices in Principal Cities—Conveniently Located Warehouses

Nonferrous Metals

Cents per pound, carlots, except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99 + %, ingots 24.40, pigs 22.50. 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 26.20; No. 43, 5% Si, 26.00; 142, 4% Cu, 1.5% Mg, 2% Ni, 28.20; No. 195, 4.5% Cu, 0.8% Si, 27.60; No. 214, 3.8% Mg, 27.80; No. 356, 7% Si, 0.3% Mg, 26.20.

Antimony: R.M.M. brand, 99.5%, 33.00, Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.50, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $72.75 per lb of contained Be, f.o.b. Reading, Pa., Elmore, O.

Beryllium Copper: 3.75-4.25% Be $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa. or Elmore, O.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb, deld.

Cobalt: 97-99%, $2.60 per lb for 550-lb keg; $2.62 per lb for 100-lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 43.00 deld. Conn. Valley; 43.00 deld. Midwest; custom smelters, 46.00-46.50 deld.; Lake, 43.00 deld.; Fire refined, 42.75 deld.

Germanium: 99.9%, $295 per lb, nom.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $100-$120 nom, per troy oz.

Lead: Common, 15.30, chemical, 15.40, corroding, 15.40, St. Louis, New York basis, add 0.20.

Lithium: 99% +, cups, or ingot, $11.50; rod, $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: 99.8%, self-palletizing pig, 32.50; notched ingot, 33.25, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., add 1.40 for pig and 1.45 for ingot; for Madison, Ill., add 1.20 for pig and 1.25 for ingot; for Los Angeles, add 2.00 for both pig and ingot. Sticks 1.3 in. diameter, 53.00, 100 to 4999 lb, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91C and alloys C, G, H and R, 36.00; alloy M, 38.00, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., add 1.40; for Madison, Ill., add 0.50; for Los Angeles, add 2.50.

Mercury: Open market, spot, New York, $278-$285 per 76-lb flask.

Molybdenum: Powder 99% hydrogen reduced, $3-$3.25 per lb; pressed ingot, $4.06 per lb; sintered ingot, $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 64.50; 10-lb pigs, unpacked, 67.65; "XX" nickel shot, 69.00; "F" nickel shot or ingots for addition to cast iron, 64.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $80-$100, nom., per troy oz.

Palladium: $22.$24 per troy oz.

Platinum: $97-$112 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $45-$55 per troy oz.

Selenium: 99.5%, $9-$10 per lb.

Silver: Open market, 91.625 per troy oz.

Sodium: 16.50, c.l.; 17.00, l.c.l.

Tantalum: Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

Tellurium: $1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot 98.875; prompt, 98.75.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max), $3.75, grade A-2 (0.5% Fe max), $3.25 per pound.

Tungsten: Powder, 98.8%, carbon, reduced, 1000-lb lots, $4.50 per lb, nom., f.o.b. shipping point; less than 1000 lb add 15.00; 99+% hydrogen reduced, $4.65. Treated ingots, $6.70.

Zinc: Prime Western, 13.00; brass special, 13.25; intermediate, 13.50, East St. Louis, freight allowed over 0.50 per pound. High grade, 14.35; special high grade 14.50-14.75, deld. Diecasting alloy ingot No. 3, 17.50; No. 2, 18.50; No. 5, 18.00, deld.

Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, $10 per lb. Powder electronics grade, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 31.50-33.50; No. 12 foundry alloy (No. 2 grade) 30.50-30.75; 5% silicon alloy, 0.60 Cu max, 32.00-32.75; 13 alloy, 0.60 Cu max, 32.00-32.75; 195 alloy, 32.00-32.75; 108 alloy, 30.50. **Steel** deoxidizing grades, notch bars, granulated or shot: Grade 1, 31.25-32.25; grade 2, 30.25-31.25; grade 3, 29.50-30.50; grade 4, 29.00-30.00.

Brass Ingot: Red brass No. 115, 41.00; tin bronze No. 225, 54.00; No. 245, 47.25; high-leaded tin bronze No. 305, 44.75; No. 1 yellow No. 405, 32.75; manganese bronze No. 421, 36.25.

Magnesium Alloy Ingot: AZ63A, 34.00; AZ91B, 34.00; AZ91C, 34.00; AZ92A, 34.00.

NONFERROUS MILL PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy) Strip, $1.84; rod, bar, wire, $1.81.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 100,000-lb lots, 48.35; 30,000-lb lots 48.88; l.c.l., 48.98. Weatherproof, 100,000-lb lots, 46.03; 30,000-lb lots, 46.28; l.c.l, 46.78. Magnetic wire deld., 15,000 lb or more, 55.52; l.c.l., 56.27.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more, $21 per cwt; pipe, full coils, $21 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $14.00-$14.50; sheared mill plate, $11.00; strip, $14.00-$14.50; wire, $10.00-$10.50; forging billets, $8.75; hot-rolled and forged bars, $8.75.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 23.00; ribbon zinc in coils, 20.50; plates 19.50-22.25.

ZIRCONIUM

Plate, $22; H.R. strip, $19; C.R. strip, $29; forged or H.R. bars, $17; wire, 0.015 in., 1.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	102	83	99
Strip, C.R	102	92	125
Plate, H.R.	97	87	95
Rod, Shapes H.R.	87	74	93
Seamless Tubes	122	110	153
Shot, Blocks	...	71	...

ALUMINUM

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	67.9	66.4	...	...
0.156-0.172	57.5	55.9	...	...
0.188	57.5	55.9	...	71.7
0.219-0.234	54.5	52.9	...	...
0.250-0.281	54.5	52.9	...	68.4
0.313	54.5	52.9	...	65.2
Cold-finished				
0.375-0.547	53.4	51.4	63.7	61.3
0.563-0.688	53.4	51.4	60.6	57.5
0.750-1.000	52.1	50.1	55.4	54.2
1.063	52.1	50.1	...	52.3
1.125-1.500	50.1	48.2	53.6	52.3
Rolled				
1.563	48.8	46.9	...	...
1.625-2.000	48.2	46.2	...	50.5
2.125-2.500	47.0	45.0	...	...
2.563-3.375	45.6	43.6	...	...

ALUMINUM

Sheets and Circles: 1100 and 3003 mill finish (30,000 lb base; freight allowed)

Thickness Range Inches	Flat Sheet	Flat Sheet Circles*	Coiled Sheet	Coiled Sheet Circle†
0.249-0.126	37.5	42.3	...	...
0.125-0.096	38.0	43.2	...	...
0.095-0.077	38.7	44.2	36.1	41.3
0.076-0.061	39.3	45.1	36.3	41.5
0.060-0.048	39.9	45.6	36.7	42.0
0.047-0.038	40.4	46.5	37.2	42.4
0.037-0.030	40.8	47.0	37.6	43.1
0.029-0.024	41.4	47.5	37.9	43.6
0.023-0.019	42.2	49.0	38.8	44.5
0.018-0.017	43.0	...	39.4	45.4
0.016-0.015	43.9	...	40.2	46.6
0.014	44.9	...	41.2	47.9
0.013-0.012	46.1	...	41.9	48.9
0.011	47.1	...	43.1	50.5
0.010-0.0095	48.4	...	44.3	52.2
0.009-0.0085	49.7	...	45.8	54.3
0.008-0.0075	51.3	...	47.0	56.1
0.007	52.8	...	48.5	58.4
0.006	54.4	...	49.9	63.4

*48 in. max diam. †26 in. max diam.

ALUMINUM

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam. 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	36.5	40.8
5050-F	37.6	41.9
3004-F	38.6	43.8
5052-F	39.9	45.2
6061-T6	41.1	46.0
2024-T4*	43.6	49.9
7075-T6*	51.4	58.5

*24-48 in. widths or diam, 72-180 in. lengths

ALUMINUM

Forging Stock: Round, Class 1, 39.10-50.10 in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 43.00-56.20 in random lengths, 0.375-4 in. thick, widths 0.750-10 in.

Pipe: ASA. Schedule 40, alloy 6063-T6, 20-ft lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
¾	$16.85	2	$ 51.95
1	26.50	4	143.00
1¼	35.85	6	256.70
1½	42.90	8	386.30

MAGNESIUM

Sheet: AZ31, commercial grade, 0.032 in., 99c; 0.064 in., 78.00c; 0.125 in., 63.50c, 30,000 lb and over, f.o.b. mill.

Plate: AZ31, 61.00c, 30,000 lb or more, 0.250 in. and over, widths 24-60 in., lengths 72-180 in.; tread plate, 64.00c, 30,000 lb or more, ¼-in. thick, widths 24-60 in., lengths 60-192 in.; tooling plate 66.00c, 30,000 lbs or more, .250-3.000 in., widths 60-72 in., lengths 72-180 in.

Extrusions: AZ31 commercial grade, rectangles, ¼ x 2 in., 64.70c; 1 x 4 in., 69.50c. Rod, 1 in., 61.50c; 2 in., 59.00c. Tubing, 1 in. OD x 0.065 in., 82.50c; Angles, 1 x 1 x ⅛-in., 68.40c; 2 x 2 x ¼-in., 62.50c. Channels, 5 in., 63.40c. I-beams, 5 in., 62.70c.

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 1100 clippings, 19.50-20.00; old sheets 16.50-17.25; borings and turnings, 11.00-11.50; crankcases, 16.50-17.25; industrial castings 16.50-17.25.

Copper and Brass: No. 1 heavy copper and wire, 38.00-38.50; No. 2 heavy copper and wire, 35.50-36.00; light copper, 33.00-33.50; No. 1 composition red brass, 29.50-30.00; No. 1 composition turnings, 28.50-29.00; yellow

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	62.76-63.13b	60.36c	....	62.82-63.32	39.000	39.000	38.250
Yellow Brass	52.27	42.41d	52.81	55.18	28.875	28.625	26.750
Red Brass, 85%	58.09	58.03	58.63	60.90	34.250	34.000	33.500
Low Brass, 80%	56.55	56.49	57.09	59.36	32.750	32.250	31.750
Naval Brass	55.63	49.94	62.69	58.79	26.750	26.500	26.000
Com. Bronze, 90%	60.18	60.12	60.72	62.74	35.750	35.500	35.000
Nickel Silver, 10%	66.00	68.33g	68.33	....	32.500	32.250	16.250
Phos. Bronze, A, 5%	80.99	81.49	81.49	82.67	39.250	39.000	38.000
Silicon Bronze	66.54	65.73	66.58	68.68e	37.625	37.375	36.875
Manganese Bronze	59.37-59.45	53.38-53.47	63.82	....	27.000	26.750	26.000
Muntz Metal	53.74	49.55	....	....	27.000	26.750	26.250

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded.

brass turnings, 15.50-16.00; new brass clippings, 25.00-25.50; light brass, 17.00-17.50; heavy yellow brass, 20.00-20.50; new brass rod ends, 23.50-24.00; auto radiators, unsweated, 23.50-24.00; cocks and faucets, 23.50-24.00; brass pipe, 23.50-24.50.

Lead: Heavy, 12.00-12.50; battery plates, 6.50-6.75; linotype and stereotype, 13.25-14.25; electrotype, 12.00-12.75; mixed babbitt, 14.50.

Magnesium: Clippings, 18.50-19.50; clean castings, 18.00-19.00; iron castings, not over 10% removable Fe, less full deduction for Fe, 16.00-17.00.

Monel: Clippings, 54.50-60.00; old sheets, 45.00-50.00; turnings, 44.00; rods, 54.50-60.00.

Nickel: Sheets and clips, 90.00-125.00; rolled anodes, 90.00-125.00; turnings, 75.00-100.00; rod ends, 90.00-125.00.

Zinc: Old zinc, 5.00-6.00; new die-cast scrap, 5.00-5.75; old die-cast scrap, 3.25-3.50.

REFINER'S BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 23.00; 3003 clippings, 22.75-23.00; 6151 clippings, 22.50-23.00; 5052 clippings, 22.50-23.00; 2014 clippings, 22.00-22.50; 2017 clippings, 22.00-22.50; 2024 clippings, 22.00-22.50; mixed clippings, 22.00-22.50; old sheet, 19.50-20.00; old cast, 20.00-20.50; clean old cable (free of steel), 23.00; borings and turnings, 20.00-21.00.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 65.00; light scrap, 60.00; turnings and borings, 43.00-55.00.

Copper and Brass: No. 1 heavy copper and wire, 40.50; No. 2 heavy copper and wire, 39.00; light copper, 36.75; refinery brass (60% copper) per dry copper content, 37.00.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 40.50; No. 2 heavy copper and wire, 39.00; light copper, 36.75; No. 1 composition borings, 32.50-33.50; No. 1 composition solids, 33.50-34.00; heavy yellow brass solids, 22.50-23.00; yellow brass turnings, 21.50; radiators, 26.00.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 59.42-59.79, oval, 58.92, 5000-10,000 lb; electrodeposited, 56.78, 2000-5000 lb lots; cast 62.54, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, $1.015; 100-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb. All prices eastern delivery effective Jan. 1, 1955.

Tin: Bar or slab, less than 200 lb, $1.175; 200-499 lb, $1.16; 500-999 lb, $1.155; 1000 lb or more, $1.15.

Zinc: Balls, 21.00; flat tops, 21.00; flats, 22.75; ovals, 22.00, ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100-lb drums.

Chromic Acid: Less than 10,000 lb, 28.50; over 10,000 lb, 27.50.

Copper Cyanide: 100 lb, 85.25; 200 lb, 84.50; 300 lb, 84.25; 400-900 lb, 85.50; 1000 lb, 81.50.

Copper Sulphate: 500-1900 lb, 17.90; 2000-5900 lb, 15.90; 6000 lb or more, 15.65.

Nickel Chloride: 100 lb, 46.50; 200 lb, 44.50; 300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 lb, 39.50; 10,000 lb and over, 38.50. All prices eastern delivery, effective Jan. 1, 1955.

Nickel Sulphate: 100 lb, 38.25; 200 lb, 36.25; 3300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 lb, 31.25; 36,000 lb, 30.25. All prices eastern delivery, effective Jan. 1, 1955.

Silver Cyanide: (Cents per ounce) 4-oz bottle, 86.875; 16-oz bottle, 85.625; 80-oz bottle, 83.125; 100-oz bottle, 83.125; f.o.b. St. Louis, New York and Los Angeles. Effective Sept. 30, 1955.

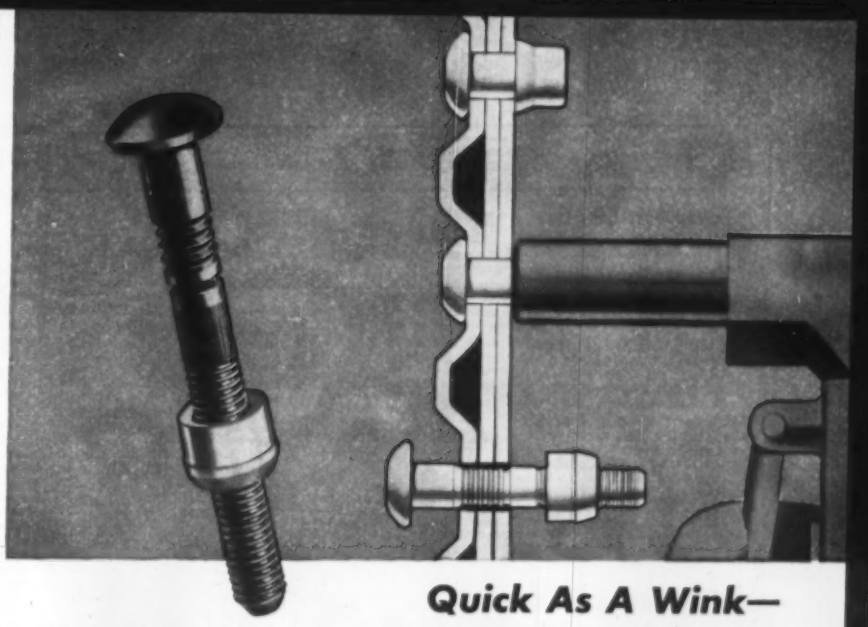
Sodium Cyanide: Egg, under 1000 lb, 19.80; 1000-19,900 lb, 18.80; 20,000 lb and over, 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb, 74.00; 100-600 lb, 59.60; 700-1900 lb, 57.10; 2000-9900 lb, 55.30; 10,000 lb or more, 54.20.

Stannous Chloride (Anhydrous): Less than 50 lb, $1.606; 50 lb, $1.266; 100-300 lb, $1.116; 400-900 lb, $1.092; 1000-1900 lb, $1.068; 2000-4900 lb, $1.031; 5000-19,900 lb, 97.00; 20,000 lb or more, 90.90.

Stannous Sulphate: Less than 50 lb, $1.304; 50 lb, $1.004; 100-1900 lb, 98.40; 2000 lb or more, 96.40.

Zinc Cyanide: Under 1000 lb, 54.30; 1000 lb and over, 52.30.



Quick As A Wink—
You Get Secure, Permanent Fastening With Townsend Lockbolts

In less than a second, with one squeeze of the trigger, a Townsend lockbolt pulls the work together with a high clinching action, is locked in place with uniform pressure. It is a quick method of producing tight, rigid, permanent fastenings that cannot loosen even under extreme vibration or shock conditions.

Townsend lockbolts combine the advantages of riveting and bolting—eliminate the disadvantages. Installation is fast—under certain conditions, one man will install 30 in only 60 seconds. Fewer workers will complete an assembly in less time than when riveting or bolting.

The clamping action, or clinch, of Townsend lockbolts is higher than rivets—is more uniform than bolts and nuts. The lockbolt fills the hole better than other fasteners, thus making possible a more rigid joint and also providing an effective liquid seal.

The Townsend lockbolt consists of two precision-made parts—a pin and a collar. Locking grooves are provided on the pin into which the collar is swaged by the pneumatic gun. The pulling section of the pin breaks in tension at a predetermined point when the setting action is completed.

Townsend lockbolts are available in steel and aluminum alloy, in 3/16", 1/4", 5/16" and 3/8" diameters, in grip lengths ranging up to 2", in various head styles. For information on how to speed production, get tight, secure, permanent fastening with Townsend lockbolts, use the coupon below.

Licensed under Huck patent nos. RE 22,792; 2,114,493; 2,527,307; 2,531,048; 2,531,049.

THE FASTENING AUTHORITY

Townsend

COMPANY • ESTABLISHED 1816

NEW BRIGHTON, PENNSYLVANIA

Sales Offices in Principal Cities

Cherry Rivet Division • Santa Ana, California

TOWNSEND COMPANY
Sales Department
New Brighton, Pa.

Please send without obligation "Lockbolt" Bulletin TL-101.

Name_____ Title_____

Company_____

Street_____

City_____ Zone____ State____

Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key on page 143. Key to footnotes, Page 145.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 ....$65.50

INGOTS, Alloy (NT)

Detroit R7 ....$69.00
Houston S5 ....74.00
Midland,Pa. C18 ....69.00
Munhall,Pa. U5 ....69.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)

Aliquippa,Pa. J5 ....$68.50
Bessemer,Pa. U5 ....68.50
Bridgeport,Conn. N19 ..73.50
Buffalo R2 ....68.50
Clairton,Pa. U5 ....68.50
Ensley,Ala. T2 ....68.50
Fairfield,Ala. T2 ....68.50
Fontana,Calif. K1 ....76.00
Gary, Ind. U5 ....68.50
Johnstown,Pa. B2 ....68.50
Lackawanna,N.Y. B2 ..68.50
LoneStar,Tex. L6 ....74.50
Munhall, Pa. U5 ....68.50
Pittsburgh J5 ....68.50
S.Chicago,Ill. R2, U5..68.50
S.Duquesne,Pa. U5 ...68.50
Youngstown R2 ....68.50

Carbon, Forging (NT)

Aliquippa,Pa. J5 ....$84.50
Bessemer,Pa. U5 ....84.50
Bridgeport,Conn. N19..89.50
Buffalo R2 ....84.50
Canton,O. R2 ....86.50
Clairton,Pa. U5 ....84.50
Conshohocken,Pa. A3..89.50
Ensley,Ala. T2 ....84.50
Fairfield,Ala. T2 ....84.50
Fontana,Calif. K1 ....92.00
Gary,Ind. U5 ....84.50
Geneva,Utah C11 ....84.50
Houston S5 ....89.50
Johnstown,Pa. B2 ....84.50
Lackawanna,N.Y. B2..84.50
Los Angeles B3 ....94.00
Midland,Pa. C18 ....84.50
Munhall,Pa. U5 ....84.50
Pittsburgh J5 ....84.50
Seattle B3 ....98.00
S.Chicago R2,U5,W14..84.50
S.Duquesne,Pa. U5 ...84.50
S.SanFrancisco B3 ....94.00

Alloy, Forging (NT)

Bethlehem,Pa. B2 ...$96.00
Buffalo R2 ....96.00
Canton,O. R2, T7 ...96.00
Conshohocken,Pa. A3..103.00
Detroit R7 ....96.00
Fontana,Calif. K1 ....115.00
Gary,Ind. U5 ....96.00
Houston S5 ....101.00
Ind.Harbor,Ind. Y1 ...96.00
Johnstown,Pa. B2 ....96.00
Lackawanna,N.Y. B2 ..96.00
LosAngeles B3 ....116.00
Massillon,O. R2 ....96.00
Midland,Pa. C18 ....96.00
Munhall,Pa. U5 ....96.00
S.Chicago R2,U5,W14..96.00
S.Duquesne,Pa. U5 ...96.00
Struthers,O. Y1 ....96.00
Warren,O. C17 ....96.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2 ....$103.50
Canton,O. R2 ....103.50
Cleveland R2 ....103.50
Gary,Ind. U5 ....103.50
S.Chicago R2, W14 ...103.50
S.Duquesne,Pa. U5 ...103.50

SKELP

Aliquippa,Pa. J5 ....4.325
LoneStar,Tex. L6 ....4.625
Munhall,Pa. U5 ....4.225
SparrowsPoint,Md. B2..4.225
Warren,O. R2 ....4.225
Youngstown R2, U5 ...4.225

WIRE RODS

AlabamaCity,Ala. R2 ..5.025
Aliquippa,Pa. J5 ....5.025
Alton,Ill. L1 ....5.20
Buffalo B11, W12 ....5.025
Cleveland A7 ....5.025
Donora,Pa. A7 ....5.025
Fairfield,Ala. T2 ....5.025
Houston S5 ....5.275
IndianaHarbor,Ind. Y1..5.025
Johnstown,Pa. B2 ....5.025
Joliet,Ill. A7 ....5.025
KansasCity,Mo. S5 ....5.275
Kokomo,Ind. C16 ....5.125
LosAngeles B3 ....5.825
Minnequa,Colo. C10 ...5.275
Monessen,Pa. P7 ....5.025
N.Tonawanda,N.Y. B11..5.025
Pittsburg,Calif. C11 ...5.675
Portsmouth P12 ....5.025
Roebling,N.J. R5 ....5.125
S.Chicago,Ill. R2 ....5.025
SparrowsPoint,Md. B2..5.125
Sterling,Ill.(1) N15 ....5.025
Sterling,Ill. N15 ....5.125
Struthers,O. Y1 ....5.025
Worcester,Mass. A7 ...5.325

STRUCTURALS

Carbon Steel Std. Shapes

Ala.City,Ala. R2 ....4.60
Aliquippa,Pa. J5 ....4.60
Bessemer,Ala. T2 ....4.60
Bethlehem,Pa. B2 ....4.65
Birmingham C15 ....4.60
Clairton,Pa. U5 ....4.60
Fairfield,Ala. T2 ....4.60
Fontana,Calif. K1 ....5.25
Gary,Ind. U5 ....4.60
Geneva,Utah C11 ....4.60
Houston S5 ....4.70
Ind.Harbor,Ind. I-2 ....4.60
Johnstown,Pa. B2 ....4.65
KansasCity,Mo. S5 ....4.70
Lackawanna,N.Y. B2 ....4.65
LosAngeles B3 ....5.30
Minnequa,Colo. C10 ....4.90
Munhall,Pa. U5 ....4.60
Niles,Calif. P1 ....4.90
Portland,Oreg. O4 ....5.35
Phoenixville,Pa. P4 ....5.15
Seattle B3 ....5.35
S.Chicago U5, W14 ....4.60
S.SanFrancisco B3 ....5.25
Torrance,Calif. C11 ....5.30
Weirton,W.Va. W6 ....4.60

Wide Flange

Bethlehem,Pa. B2 ....4.65
Clairton,Pa. U5 ....4.60
Fontana,Calif. K1 ....5.40
Lackawanna,N.Y. B2 ...4.65
Munhall,Pa. U5 ....4.60
Phoenixville,Pa. P4 ....5.15
S.Chicago,Ill. U5 ....4.60

Alloy Std. Shapes

Clairton,Pa. U5 ....5.65
Fontana,Calif. K1 ....7.30
Gary,Ind. U5 ....5.65
Houston S5 ....5.75
Munhall,Pa. U5 ....5.65
S.Chicago,Ill. U5 ....5.65

H.S., L.A. Std. Shapes

Aliquippa,Pa. J5 ....6.75
Bessemer,Ala. T2 ....6.75
Bethlehem,Pa. B2 ....6.80
Clairton,Pa. U5 ....6.75
Fairfield,Ala. T2 ....6.75
Fontana,Calif. K1 ....7.40
Gary,Ind. U5 ....6.75
Geneva,Utah C11 ....6.75
Houston S5 ....6.85
Ind.Harbor,Ind. I-2, Y1..6.75
Johnstown,Pa. B2 ....6.80
KansasCity,Mo. S5 ....6.85
Lackawanna,N.Y. B2 ...6.80
LosAngeles B3 ....7.45
Munhall,Pa. U5 ....6.75
Seattle B3 ....7.50
S.Chicago,Ill. U5, W14..6.75
S.SanFrancisco B3 ....7.40
Struthers,O. Y1 ....6.75

H.S., L.A. Wide Flange

Bethlehem,Pa. B2 ....6.80
Lackawanna,N.Y. B2 ...6.80
Munhall,Pa. U5 ....6.75
S.Chicago,Ill. U5 ....6.75

PILING

BEARING PILES

Bethlehem,Pa. B2 ....4.65
Lackawanna,N.Y. B2 ...4.65
Munhall,Pa. U5 ....4.60
S.Chicago,Ill. U5 ....4.60

STEEL SHEET PILING

Ind.Harbor,Ind. I-2 ....5.45
Lackawanna,N.Y. B2 ....5.45
Munhall,Pa. U5 ....5.45
S.Chicago,Ill. U5 ....5.45

PLATES

PLATES, Carbon Steel

Ala.City,Ala. R2 ....4.50
Aliquippa,Pa. J5 ....4.50
Ashland,Ky.(15) A10 ...4.50
Bessemer,Ala. T2 ....4.50
Bridgeport,Conn. N19 ..4.75
Buffalo R2 ....4.50
Clairton,Pa. U5 ....4.50
Claymont,Del. C22 ....4.80
Cleveland J5, R2 ....4.60
Coatesville,Pa. L7 ....4.80
Conshohocken,Pa. A3 ..4.50
Detroit M1 ....4.60
Ecorse,Mich. G5 ....4.60
Fairfield,Ala. T2 ....4.50
Fontana,Calif.(30) K1 ..5.15
Gary,Ind. U5 ....4.50
Geneva,Utah C11 ....4.50
GaniteCity,Ill. G4 ....4.70
Harrisburg,Pa. P4 ....5.10
Houston S5 ....4.60
Ind.Harbor,Ind. I-2, Y1..4.50
Johnstown,Pa. B2 ....4.50
Lackawanna,N.Y. B2 ...4.50
LoneStar,Tex. L6 ....4.85
Mansfield,O. E6 ....4.50
Minnequa,Colo. C10 ....5.35
Munhall,Pa. U5 ....4.50
Newport,Ky. N9 ....4.50
Pittsburgh J5 ....4.50
Riverdale,Ill. A1 ....4.50
Seattle B3 ....5.40
Sharon,Pa. S3 ....4.50
S.Chicago R2, U5, W14..4.50
SparrowsPoint,Md. B2 ..4.50
Steubenville,O. W10 ....4.50
Warren,O. R2 ....4.50
Weirton,W.Va. W6 ....4.50
Youngstown R2, U5, Y1..4.50

PLATES, Carbon Abras. Resist.

Claymont,Del. C22 ....5.65
Fontana,Calif. K1 ....6.30
Geneva,Utah C11 ....5.65
Johnstown,Pa. B2 ....5.65
SparrowsPoint,Md. B2 ..5.65

PLATES, Wrought Iron

Economy,Pa. B14 ....10.40

PLATES,High-Strength Low-Alloy

Aliquippa,Pa. J5 ....6.725
Bessemer,Ala. T2 ....6.725
Clairton,Pa. U5 ....6.725
Cleveland J5, R2 ....6.725
Claymont,Del. C22 ....6.725
Coatesville,Pa. L7 ....6.725
Conshohocken,Pa. A3 ..6.725
Ecorse,Mich. G5 ....6.825
Fairfield,Ala. T2 ....6.725
Fontana,Calif.(30) K1 ..7.375
Gary,Ind. U5 ....6.725
Geneva,Utah C11 ....6.725
Houston S5 ....6.825
Ind.Harbor,Ind. I-2, Y1..6.725
Johnstown,Pa. B2 ....6.725
LosAngeles B3 ....7.625
Munhall,Pa. U5 ....6.725
Pittsburgh J5 ....6.725
Seattle B3 ....7.625
Sharon,Pa. S3 ....6.725
S.Chicago,Ill. U5, W14..6.725
SparrowsPoint,Md. B2..6.725
Youngstown U5, Y1 ...6.725

PLATES, Alloy

Bridgeport,Conn. N19 ...6.55
Claymont,Del. C22 ....6.30
Coatesville,Pa. L7 ....6.30
Fontana,Calif. K1 ....6.95
Gary,Ind. U5 ....6.30
Houston S5 ....6.40
Ind.Harbor,Ind. Y1 ....6.30
Johnstown,Pa. B2 ....6.30
Munhall,Pa. U5 ....6.30
Newport,Ky. N9 ....6.30
Seattle B3 ....7.20
Sharon,Pa. S3 ....6.30
S.Chicago,Ill. U5, W14..6.30
SparrowsPoint,Md. B2 ..6.30
Youngstown Y1 ....6.30

FLOOR PLATES

Cleveland J5 ....5.575
Conshohocken,Pa. A3 ..5.575
Harrisburg,Pa. P4 ....5.575
Ind.Harbor,Ind. I-2 ....5.575
Munhall,Pa. U5 ....5.575
S.Chicago,Ill. U5 ....5.575

PLATES, Ingot Iron

Ashland c.l. (15) A10...4.75
Ashland l.c.l. (15) A10..5.25
Cleveland c.l. R2 ....5.10
Warren,O. c.l. R2 ....5.10

BARS

BARS, Hot-Rolled Carbon

Ala.City,Ala. R2 ....4.65
Aliquippa,Pa. J5 ....4.65
Alton,Ill. L1 ....4.85
Atlanta A11 ....4.85
Bessemer,Ala. T2 ....4.65
Birmingham C15 ....4.65
Bridgeport,Conn. N19 ..4.80
Buffalo R2 ....4.65
Canton,O. R2 ....4.75
Clairton,Pa. U5 ....4.65
Cleveland R2 ....4.65
Ecorse,Mich. G5 ....4.75
Emeryville,Calif. J7 ....5.40
Fairfield,Ala. T2 ....4.65
FairlessHills,Pa. U5 ....4.80
Fontana,Calif. K1 ....5.35
Gary,Ind. U5 ....4.65
Houston S5 ....4.90
Ind.Harbor,Ind. I-2, Y1..4.65
Johnstown,Pa. B2 ....4.65
Joliet,Ill. P22 ....4.65
KansasCity,Mo. S5 ....4.90
Lackawanna,N.Y. B2 ...4.65
LosAngeles B3 ....5.35
Massillon,O. R2 ....4.75
Midland,Pa. C18 ....4.65
Milton,Pa. M18 ....4.65
Minnequa,Colo. C10 ....5.10
Niles,Calif. P1 ....5.00
N.Tonawanda,N.Y. B11..4.65
Pittsburg,Calif. C11 ...5.35
Pittsburgh J5 ....4.65
Portland,Oreg. O4 ....5.40
Seattle B3, N14 ....5.40
S.Chicago R2, U5, W14..4.65
S.Duquesne,Pa. U5 ....4.65
S.SanFran.,Calif. B3 ....5.40
Sterling,Ill.(1) N15 ....4.65
Sterling,Ill. N15 ....4.75
Struthers,O. Y1 ....4.65
Torrance,Calif. C11 ....5.35
Warren,O. R2 ....4.65
Weirton,W.Va. W6 ....4.65
Youngstown R2, U5 ....4.65

BARS, H.R. Leaded Alloy

Warren,O. C17 ....6.325

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2 ....5.575
Bridgeport,Conn. N19 ..5.725
Buffalo R2 ....5.575
Canton,O. R2, T7 ....5.575
Clairton,Pa. U5 ....5.575
Detroit R7 ....5.575
Ecorse,Mich. G5 ....5.675
Fontana,Calif. K1 ....6.625
FairlessHills,Pa. U5 ....5.725
Gary,Ind. U5 ....5.575
Houston S5 ....5.825
Ind.Harbor,Ind. I-2,Y1..5.575
Johnstown,Pa. B2 ....5.575
KansasCity,Mo. S5 ....5.825
Lackawanna,N.Y. B2 ...5.575
LosAngeles B3 ....6.625
Massillon,O. R2 ....5.575
Midland,Pa. C18 ....5.575
S.Chicago, R2, U5, W14..5.575
S.Duquesne,Pa. U5 ....5.575
Struthers,O. Y1 ....5.575
Warren,O. C17 ....5.575
Youngstown U5 ....5.575

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

Aliquippa,Pa. J5 ....6.80
Bessemer,Ala. T2 ....6.80
Bethlehem,Pa. B2 ....6.80
Clairton,Pa. U5 ....6.80
Cleveland R2 ....6.80
Ecorse,Mich. G5 ....6.90
Fairfield,Ala. T2 ....6.80
Fontana,Calif. K1 ....7.50
Gary,Ind. U5 ....6.80
Houston S5 ....7.05
Ind.Harb.,Ind. I-2, Y1 ..6.80
Johnstown,Pa. B2 ....6.80
KansasCity,Mo. S5 ....7.05
Lackawanna,N.Y. B2 ...6.80
LosAngeles B3 ....7.50
Pittsburgh J5 ....6.80
Seattle B3 ....7.55
S.Chicago W14 ....6.80
S.Duquesne,Pa. U5 ....6.80
S.SanFrancisco B3 ....7.55
Struthers,O. Y1 ....6.80
Warren,O. R2 ....6.80
Youngstown U5 ....6.80

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa. B2 ....4.80

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5 ....4.65
Atlanta A11 ....4.85
Fontana,Calif. K1 ....5.35
Niles,Calif. P1 ....5.00
Pittsburgh J5 ....4.30
Portland,Oreg. O4 ....5.05
SanFrancisco S7 ....5.05

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. U5 ....5.65
Gary,Ind. U5 ....5.65
Houston S5 ....5.90
KansasCity,Mo. S5 ....5.90
Youngstown U5 ....5.65

BARS, C.F. Leaded Alloy

Ambridge,Pa. W18 ....8.325
Camden,N.J. P13 ....8.50
Chicago W18 ....8.325
Cleveland C20 ....8.325
Monaca,Pa. S17 ....8.325
Newark,N.J. W18 ....8.50
SpringCity,Pa. K3 ....8.50
Warren,O. C17 ....8.325

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 ....5.90
BeaverFalls,Pa. M12, R2 5.90
Buffalo B5 ....5.95
Camden,N.J. P13 ....6.35
Carnegie,Pa. C12 ....5.90
Chicago W18 ....5.90
Cleveland A7, C20 ....5.90
Detroit R7 ....5.90
Detroit B5, P17 ....6.10
Donora,Pa. A7 ....5.90
Elyria,O. W18 ....5.90
FranklinPark,Ill. N5 ...5.90
Gary,Ind. R2 ....5.90
GreenBay,Wis. F7 ....5.90
Hammond,Ind. L2, M13..5.90
Hartford,Conn. R2 ....6.40
Harvey,Ill. B5 ....5.90
LosAngeles R2, S30 ....7.35
Mansfield,Mass. B5 ....6.45
Massillon,O. R2, R8 ....5.90
Midland,Pa. C18 ....5.90
Monaca,Pa. S17 ....5.90
Newark,N.J. W18 ....6.35
NewCastle,Pa.(17) B4 ..5.90
Pittsburgh J5 ....5.90
Plymouth,Mich. P5 ....6.15
Putnam,Conn. W18 ....6.45
Readville,Mass. C14 ....6.45
S.Chicago,Ill. W14 ....5.90
SpringCity,Pa. K3 ....6.35
Struthers,O. Y1 ....5.90
Waukegan,Ill. A7 ....5.90
Worcester,Mass. W19 ..6.35
Youngstown F3, Y1 ....5.90

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md. C19 ..5.15

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 ....7.425
BeaverFalls,Pa.M12,R2 7.425
Bethlehem,Pa. B2 ....7.425
Buffalo B5 ....7.425
Camden,N.J. P13 ....7.60
Canton,O. T7 ....7.425
Carnegie,Pa. C12 ....7.425
Chicago W18 ....7.425
Cleveland A7, C20 ....7.425
Detroit R7 ....7.425
Detroit B5, P17 ....7.625
Donora,Pa. A7 ....7.425
Elyria,O. W8 ....7.425
Gary,Ind. R2 ....7.425
GreenBay,Wis. F7 ....7.425
Hammond,Ind. L2, M13..7.425
Hartford,Conn. R2 ....7.725
Harvey,Ill. B5 ....7.425
Lackawanna,N.Y. B2 ..7.425
LosAngeles S30 ....9.10
Mansfield,Mass. B5 ...7.725
Massillon,O. R2, R8 ...7.425
Midland,Pa. C18 ....7.425
Monaca,Pa. S17 ....7.425
Newark,N.J. W18 ....7.60
Plymouth,Mich. P5 ...7.625
S.Chicago W14 ....7.425
SpringCity,Pa. K3 ....7.60
Struthers,O. Y1 ....7.425
Warren,O. C17 ....7.425
Waukegan,Ill. A7 ....7.425
Worcester,Mass. A7 ...7.725
Youngstown F3, Y1 ...7.425

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2 ....4.65
Altanta A11 ....4.85
Birmingham C15 ....4.65
Buffalo R2 ....4.65
Cleveland R2 ....4.65
Ecorse,Mich. G5 ....4.75
Emeryville,Calif. J7 ....5.40
Fairfield,Ala. T2 ....4.65
FairlessHills,Pa. U5 ....4.80
Fontana,Calif. K1 ....5.35
Ft.Worth,Tex.(42) T4 ..5.10
Gary,Ind. U5 ....4.65
Houston S5 ....4.90

Ind.Harbor,Ind. I-2, Y1 4.65
Johnstown,Pa. B2 ..... 4.65
Joliet,Ill. P22 ..... 4.65
KansasCity,Mo. S5 ..... 4.90
Lackawanna,N.Y. B2 .. 4.65
LosAngeles B3 ..... 5.35
Milton,Pa. M18 ..... 4.65
Minnequa,Colo. C10 .... 5.10
Niles,Calif. P1 ..... 5.00
Pittsburg,Calif. C11 .... 5.35
Pittsburgh J5 ..... 4.65
Portland,Oreg. O4 ..... 5.40
SandSprings,Okla. S5 .. 5.15
Seattle B3, N14 ..... 5.40
S.Chicago R2 ..... 4.65
S.Duquesne,Pa. U5 .... 4.65
S.SanFrancisco B3 .... 5.40
SparrowsPoint,Md. B2 .. 4.65
Sterling,Ill.(1) N15 .... 4.65
Sterling,Ill. N15 ..... 4.75
Struthers,O. Y1 ..... 4.65
Torrance,Calif. C11 .... 5.35
Youngstown R2, U5, Y1 4.65

BARS, Reinforcing (Fabricated; to Consumers)

Johnstown,Pa. ¼-1" B2 6.15
KansasCity,Kans. S5 .. 6.45
Lackawanna,N.Y. B2 .. 6.17
Marion,O. P11 ..... 5.90
Pittsburgh U8 ..... 6.17
Seattle B3, N14 ..... 6.60
SparrowsPt. ½-1" B2 .. 6.15
Williamsport, Pa. S19 .. 6.00

RAIL STEEL BARS

Avis,Pa.(3) J8 ..... 4.25
ChicagoHts.(3) C2, I-2 4.65
ChicagoHts.(4) C2, I-2 .. 4.65
Ft.Worth,Tex.(26) T4 .. 5.10
Franklin,Pa. (3) F5 .... 4.65
Franklin,Pa.(4) F5 .... 4.65
Marion,O.(3) P11 ..... 4.50
Moline,Ill.(3) R2 ..... 4.65
Tonawanda(3) B12 .... 4.50
Tonawanda(4) B12 .... 4.65
Williamsport,Pa.(3) S19 4.65

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 11.50
Economy,Pa(D.R.)B14 14.30
Economy(Staybolt)B14 14.65
McK.Rks. (S.R.) L5 .. 11.50
McK.Rks. (D.R.) L5 .. 16.00
McK.Rks.(Staybolt) L5.17.00

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2 ..... 4.325
Allenport,Pa. P7 ..... 4.325
Ashland,Ky.(8) A10 .. 4.325
Cleveland J5, R2 .... 4.325
Conshohocken,Pa. A3 .. 4.375
Detroit(8) M1 ..... 4.425
Dravosburg,Pa. U5 .... 4.325
Ecorse,Mich. G5 ..... 4.425
Fairfield,Ala. T2 ..... 4.325
FairlessHills,Pa. U5 .. 4.375
Fontana,Calif. K1 .... 5.075
Gary,Ind. U5 ..... 4.325
Geneva,Utah C11 .... 4.425
GraniteCity,Ill. G4 .... 4.525
Ind.Harbor,Ind. I-2, Y1 4.325
Kokomo,Ind. C16 .... 4.425
Lackawanna,N.Y. B2 .. 4.325
Mansfield,O. E6, (37) .. 4.325
Munhall,Pa. U5 ..... 4.325
Newport,Ky.(8) N9 .. 4.325
Niles,O. N12 ..... 4.325
Pittsburg,Calif. C11 .... 5.025
Pittsburgh J5 ..... 4.325
Portsmouth,O. P12 .... 4.325
Riverdale,Ill. A1 ..... 4.325
Sharon,Pa. S3 ..... 4.325
S.Chicago,Ill. W14 .... 4.325
SparrowsPoint,Md. B2.4.325
Steubenville,O. W10 .. 4.325
Warren,O. R2 ..... 4.325
Weirton,W.Va. W6 .... 4.325
Youngstown U5, Y1 .. 4.325

SHEETS, H.R. (19 Ga. & Lighter)

Ala.City,Ala. R2 ..... 5.625
Kokomo,Ind. C16 .... 5.475
Niles,O. N12 ..... 5.325

SHEETS, H.R. Alloy

Ind.Harbor,Ind. Y1 .... 7.20
Youngstown Y1 ..... 7.20

SHEETS, H.R.(14 Ga. & Heavier) High-Strength Low-Alloy

Cleveland J5, R2 ..... 6.375
Conshohocken,Pa. A3 .. 6.425
Dravosburg,Pa. U5 .... 6.375
Ecorse,Mich. G5 .... 6.475
Fairfield,Ala. T2 .... 6.375
FairlessHills,Pa. U5 .. 6.425
Fontana,Calif. K1 .... 7.125
Gary,Ind. U5 ..... 6.375
Ind.Harbor,Ind. I-2, Y1 6.375
Lackawanna(35) B2 .. 6.375
Munhall,Pa. U5 ..... 6.375
Pittsburgh J5 ..... 6.375
Sharon,Pa. S3 ..... 6.375
S.Chicago,Ill. U5 .... 6.375
SparrowsPoint(36) B2. .6.375
Warren,O. R2 ..... 6.375
Weirton,W.Va. W6 .... 6.375
Youngstown U5, Y1 .. 6.375

SHEET, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 .. 4.575
Ind.Harbor,Ind. I-2 ...4.575

SHEETS, Cold-Rolled Steel (Commercial Quality)

Allenport,Pa. P7 ..... 5.325
Cleveland J5, R2 .... 5.325
Conshohocken,Pa. A3 .. 5.375
Dravosburg,Pa. U5 .... 5.325
Detroit M1 ..... 5.325
Ecorse,Mich. G5 ..... 5.425
Fairfield,Ala. T2 .... 5.325
FairlessHills,Pa. U5 .. 5.375
Follansbee,W.Va. F4 .. 5.325
Fontana,Calif. K1 .... 6.425
Gary,Ind. U5 ..... 5.325
GraniteCity, Ill. G4 .... 5.525
Ind.Harbor,Ind. I-2, Y1 5.325
Lackawanna,N.Y. B2 .. 5.325
Mansfield,O. E6 ..... 5.325
Middletown,O. A10 .... 5.325
Newport,Ky. N9 ..... 5.325
Pittsburg,Calif. C11 .... 6.275
Pittsburgh J5 ..... 5.325
Portsmouth,O. P12 .... 5.325
SparrowsPoint,Md. B2. .5.325
Steubenville,O. W10 .. 5.325
Warren,O. R2 ..... 5.325
Weirton,W.Va. W6 .... 5.325
Youngstown Y1 ..... 5.325

SHEETS, Cold-Rolled High-Strength Low-Alloy

Cleveland J5, R2 .... 7.875
Dravosburg,Pa. U5 ..7.875
Ecorse,Mich. G5 ..... 7.975
FairlessHills,Pa. U5 .. 7.925
Fontana,Calif. K1 .... 8.975
Gary,Ind. U5 ..... 7.875
IndianaHarbor,Ind. Y1 7.875
Lackawanna(37) B2 .. 7.875
Pittsburgh J5 ..... 7.875
SparrowsPoint(38) B2. .7.875
Warren,O. R2 ..... 7.875
Weirton,W.Va. W6 .... 7.875
Youngstown Y1 ..... 7.875

SHEETS, Cold-Rolled Ingot Iron

Middletown,O. A10 ....5.825

SHEETS, Culvert (16 Gage)

	Cu Alloy	Cu Fe
Ashland,Ky.	A10 6.90	...
Canton,O.	R2 ....6.10	6.55
Dravosburg	U5 ..6.10	...
Fairfield	T2 ....6.10	...
Gary,Ind.	U5 ....6.10	6.35
Ind.Harbor	I-2 ..6.10	6.35
Kokomo,Ind.	C16..6.20	...
MartinsFry.	W10.6.10	...
Newport,Ky.	N9..6.10	6.35
Pitts.,Calif.	C11..6.85	...
SparrowsPt.	B2..6.10	...

SHEETS, Culvert—Pure Iron

Ashland,Ky. A10 .....7.15
Gary,Ind. U5 .....6.35
MartinsFry.,O. W10 ....6.35

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2 .....5.85‡
Ashland,Ky. A10 .....5.85†
Canton,O. R2 .....5.85‡
Delphos,O. N16 .....6.60‡
Dover,O. R1 .....5.85‡
Dravosburg,Pa. U5 ...5.85†
Fairfield,Ala. T2 .....5.85†
Gary,Ind. U5 .....5.85*
GraniteCity,Ill. G4 ....6.05
Ind.Harbor,Ind. I-2 ...5.85†
Kokomo,Ind. C16 .....5.95‡
MartinsFerry,O. W10 ..5.85*
Middletown,O. A10 ....5.85†
Newport,Ky. N9 .....5.85‡
Niles,O. N12 .....6.85‡
Pittsburg,Calif. C1 ....6.60*
SparrowsPt.,Md. B2 ..5.85†
Steubenville,O. W10 ..5.85‡
Warren,O. R2 .....5.85†
Weirton,W.Va. W6 ....5.85*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 .... 6.575

SHEETS, Galvanized High-Strength Low-Alloy

Dravosburg,Pa. U5 ....8.60
SparrowsPoint(39) B2 ..8.60

SHEETS, Galvannealed Steel

Canton,O. R2 .....6.25
Dravosburg,Pa. U5 ....6.25
Kokomo,Ind. C16 .....6.60
Newport,Ky. N9 .....6.25
Niles,O. N12 .....7.25

SHEETS, Galvanized Ingot Iron (Hot-dipped Continuous)

Ashland,Ky. A10 .....6.10
Middletown,O. A10 ....6.10

SHEETS, Electrogalvanized

Cleveland(28) R2 .....6.70
Niles,O.(28) R2 .....6.70
Weirton,W.Va. W6 ....6.55

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) .8.50
Butler,Pa. A10 (type 2) .8.60

SHEETS, Enameling Iron

Ashland,Ky. A10 .....5.90
Cleveland R2 .....5.90
Dravosburg,Pa. U5 ....5.90
Gary,Ind. U5 .....5.90
GraniteCity,Ill. G4 ....6.10
Ind.Harbor,Ind. I-2 ....5.90
Middletown,O. A10 ....5.90
Niles,O. N12 .....5.90
Youngstown Y1 .....5.90

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ...7.75
Ind.Harbor,Ind. I-2 ....7.75
Yorkville,O. W10 .....7.75

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10 6.25
Gary,Ind. U5 .....6.25
Mansfield,O. E6 .....6.25
Middletown,O. A10 ....6.25
Niles,O. N12 .....6.25
Weirton,W.Va. W6 ....6.25

SHEETS, Long Terne, Ingot Iron

Middletown, O. A10 ...6.65

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Division H. K. Porter Co. Inc.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve. Cold Rolling Mi'ls
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel Div., Sharon Steel Corp.
D4 Disston & Sons, Henry
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E. Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine & Special Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod. Div., Merritt-Chapman&Scott

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 NewEng.HighCarb.Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N12 Niles Rolling Mill Div., Sharon Steel Corp.
N14 Northwest.SteelRoll.Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
N19 Northeastern Steel Corp.
O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co. Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div'sion Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RellanceDiv.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service

T2 Tenn. Coal & Iron Div. U. S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
T13 Tube Methods Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div. U. S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Division, H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Whickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ..4.325
Allenport,Pa. P7 .....4.325
Alton,Ill. L1 .....4.50
Ashland,Ky.(8) A10 ..4.325
Atlanta A11 .....4.525
Bessemer,Ala. T2 ....4.325
Birmingham C15 .....4.325
Bridgeport,Conn. N19..4.625
Buffalo(27) R2 .....4.325
Conshohocken,Pa. A3 ..4.375
Detroit M1 .....4.425
Ecorse,Mich. G5 .....4.425
Fairfield,Ala. T2 .....4.325
Fontana,Calif. K1 ....5.075
Gary,Ind. U5 .....4.325
Ind.Harbor,Ind. I-2, Y1.4.325
Johnstown,Pa.(25) B2..4.325
Lackaw'na,N.Y.(24) B2 4.325
LosAngeles(25) B3 ....5.075
Milton,Pa. M18 .....4.325
Minnequa,Colo. C10 ..5.425
NewBritain(10) S15 ..4.325
N.Tonawanda,N.Y. B11 4.325
Pittsburg,Calif. C11 ..5.075
Portsmouth,O. P12 ....4.325
Riverdale,Ill. A1 .....4.325
SanFrancisco S7 .....5.05
Seattle(25) B3 .....5.325
Seattle N14 .....5.40
Sharon,Pa. S3 .....4.325
S.Chicago,Ill. W14 ....4.325
S.SanFrancisco(25) B3.5.075
SparrowsPoint,Md. B2..4.325
Sterling(1) N15 .....4.325
Sterling,Ill. N15 .....4.425
Torrance,Calif. C11 ...5.075
Warren,O. R2 .....4.325
Weirton,W.Va. W6 ....4.325
Youngstown U5 .....4.325

STRIP, Hot-Rolled Alloy

Bridgeport,Conn. N19 ..7.50
Carnegie,Pa. S18 .....7.20
Fontana,Calif. K1 ....8.85
Gary,Ind. U5 .....7.20
Ind.Harbor,Ind. Y1 ....7.20
LosAngeles B3 .....8.40
Newport,Ky. N9 .....7.20
Sharon,Pa. S3 .....7.20
S.Chicago W14 .....7.20
Youngstown U5, Y1 ....7.20

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2 ....6.425
Conshohocken,Pa. A3 ..6.425
Ecorse,Mich. G5 .....6.525
Fairfield,Ala. T2 .....6.425
Fontana,Calif. K1 ....7.525
Gary,Ind. U5 .....6.425
Houston S5 .....6.675
Ind.Harbor,Ind. I-2, Y1 6.425
KansasCity,Mo. S5 ....6.675
Lackawanna,N.Y. B2 ..6.425
LosAngeles(25) B3 ....7.175
Seattle(25) B3 .....7.425
Sharon,Pa. S3 .....6.425
S.SanFrancisco(25) B3.7.175
SparrowsPoint,Md. B2..6.425
Warren,O. R2 .....6.425
Weirton,W.Va. W6 ....6.425
Youngstown U5, Y1 ..6.425

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ..4.575

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 ....6.25
Baltimore T6 .....6.25
Boston T6 .....6.80
Buffalo S40 .....6.25
Cleveland J5 .....6.25
Cleveland A7 .....6.25
Conshohocken,Pa. A3 ..6.30
Dearborn,Mich. D3 ....6.35
Detroit D2, M1, P20 ...6.35
Dover,O. G6 .....6.25
Ecorse,Mich. G5 .....6.35
Follansbee,W.Va. F4 ..6.25
Fontana,Calif. K1 ....8.00
FranklinPark,Ill. T6 ...6.35
Ind.Harbor,Ind. I-2 ....6.35
Ind.Harbor,Ind. Y1 ....6.25
Indianapolis C8 .....6.40
Lackawanna,N.Y. B2 ..6.25
LosAngeles C1 .....8.50
NewBedford,Mass. R10..6.70
NewBritain(10) S15 ...6.25
NewCastle,Pa. B4, E5..6.25
NewHaven,Conn. A7 ....7.00
NewHaven,Conn. D2 ...6.70
NewKensington,Pa. A6..6.25
Pawtucket,R.I. R3 ....6.90
Pawtucket,R.I. N8 ....6.80
Pittsburgh J5 .....6.25
Portsmouth,O. P12 ....6.25
Riverdale,Ill. A1 .....6.35
Rome,N.Y.(32) R6 ....6.25
Sharon,Pa. S3 .....6.25
SparrowsPt.,Md. B2 ....6.25
Trenton,N.J.(31) R5 ...7.80
Wallingford,Conn. W2 ..6.70
Warren,O. R2, T5 ....6.25
Weirton,W.Va. W6 ....6.25
Worcester,Mass. A7 ....7.10
Youngstown Y1 .....6.25
Youngstown C8 .....6.25

STRIP, Cold-Rolled Alloy

Boston T6 .....13.80
Carnegie,Pa. S18 .....13.45
Cleveland A7 .....13.45
Dover,O. G6 .....13.45
FranklinPark,Ill. T6 ..13.45
Harrison,N.J. C18 ....13.45
Indianapolis C8 .....13.60
Pawtucket,R.I. N8 ....13.80
Sharon,Pa. S3 .....13.45
Worcester,Mass. A7 ..13.75
Youngstown C8 .....13.45

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland A7 .....9.10
Dearborn,Mich. D3 ....9.20
Dover,O. G6 .....9.30
Ecorse,Mich. G5 .....9.20

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	7.30	9.25	10.80	12.95	15.65
Boston T6	7.55	9.25	10.80	12.95	15.65
Bristol,Conn. W1	...	...	10.80	12.95	15.65
Carnegie,Pa. S18	...	8.95	10.50	12.65	....
Cleveland A7	7.00	8.95	10.50	12.65	15.35
Cleveland C7	...	8.95	10.50	12.65	15.35
Dearborn,Mich. D3	7.10	9.05	10.60	....	....
Detroit D2	7.10	9.05	10.60	12.75	....
Dover,O. G6	7.00	8.95	10.50	12.65	15.35
Follansbee,W.Va. F4	7.00	8.95	10.50**	....	....
FranklinPark,Ill. T6	7.10	8.95	10.50	12.65	15.35
Harrison,N.J. C18	...	...	10.80	12.95	15.65
Indianapolis C8	7.15	9.10	10.50	12.65	15.35
NewBritain,Conn.(10) S15	7.00	8.95	10.50	12.65	15.35
NewCastle,Pa. B4, E5	7.00	8.95	10.50	12.65	....
NewHaven,Conn. D2	7.45	9.25	10.80	12.95	....
NewKensington,Pa. A6	7.00	8.95	10.50	....	....
NewYork W3	...	9.25	10.80	12.95	15.65
Pawtucket,R.I. N8	7.55	9.25	10.80	12.95	15.35
Riverdale,Ill. A1	7.10	8.95	10.50	12.65	15.35
Rome,N.Y.(32) R6	7.00	8.95	10.50	12.65	15.35
Sharon,Pa. S3	7.00	8.95	10.50	12.65	15.35
Trenton,N.J. R5	...	9.25	10.80	12.95	15.65
Wallingford,Conn. W2	7.45	9.25	10.80	12.95	15.65
Warren,O. T5	7.00	8.95	10.50	12.65	15.35
Weirton,W.Va. W6	7.00	8.95	10.50	12.65	15.35
Worcester,Mass. T6	7.55	9.25	10.80	12.95	15.65
Worcester,Mass. A7	7.85	9.25	10.80	12.95	15.65
Youngstown C8	7.00	8.95	10.50	12.65	15.35

**0.065 C, max.

Spring Steel (Tempered)					
Bristol,Conn. W1	...	...	14.40	17.60	....
Buffalo, W12	...	...	14.40	....	....
FranklinPark,Ill. T6	...	...	14.90	18.10	21.50
Harrison,N.J. C18	...	...	14.40	17.60	21.00
NewYork W3	...	...	14.40	17.60	21.00
Trenton,N.J. R5	...	...	14.40	17.60	21.00
Worcester,Mass. A7, T6	...	...	14.40	17.60	21.00
Worcester,Mass. W12	...	...	14.40	....	....
Youngstown C8	...	...	14.75	17.95	21.35

Ind.Harbor,Ind. Y1 ....9.30
Lackawanna,N.Y. B2 ..9.10
Sharon,Pa. S3 .....9.10
SparrowsPoint,Md. B2 ..9.10
Warren,O. R2 .....9.10
Weirton,W.Va. W6 ....9.10
Youngstown Y1 .....9.30

STRIP, Electrogalvanized

Cleveland A7 .....6.25*
Dover,O. G6 .....6.25*
Riverdale,Ill. A1 .....6.55*
Youngstown C8 .....6.25*
Warren,O. T5 .....6.25*
Warren,O. B9 .....6.45*
Weirton,W.Va. W6 ....5.75*
Worcester,Mass. A7 ...7.10*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3 .....6.55

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.05
Riverdale,Ill. A1 .....4.90
Sharon,Pa. S3 .....4.75
Youngstown U5 .....4.75

SILICON STEEL

H.R. SHEETS(22 Ga.,cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	...	...	9.95	10.95	11.85
Brackenridge,Pa. A4	...	...	9.95	10.95	11.85
Mansfield,O. E6	8.40	9.35	9.95	10.95	11.85
Newport,Ky. N9	8.40	9.35	9.95	10.95	11.85
Niles,O. N12	8.40	9.35	9.95	10.95	....
Vandergrift,Pa. U5	...	9.35	9.95	10.95	11.85
Warren,O. R2	8.40	9.35	9.95	10.95	11.85
Zanesville,O. A10	...	9.35	9.95	10.95	11.85

C.R. COILS & CUT LENGTHS, (22 Ga.) Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	...	...	10.70	11.70	12.60
GraniteCity,Ill. G4	8.80*	9.80*	10.40*	11.40*	....
IndianaHarbor,Ind. I-2	8.60†	9.60*	10.20*	11.20*	....
Vandergrift,Pa. U5	...	10.10†	10.70†	11.70†	12.60†
Vandergrift,Pa. U5	8.60*	9.60*	10.20*	11.20*	12.10*
Warren,O. R2	8.60†	10.10	10.70	11.70	12.60
Zanesville,O. A10	...	10.10	10.70	11.70	12.60

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grade T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	12.80	13.35	13.85	14.85
Brackenridge,Pa. A4	12.80	....	....	....
Newport,Ky. N9	12.80	....	....	....
Vandergrift,Pa. U5	12.80	13.35	13.85	14.85
Zanesville,O. A10	12.80‡	13.35‡	13.85‡	14.85‡

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-72
Brackenridge,Pa. A4	....	15.85	17.45	17.95	13.55‡
Butler,Pa. A10	....	....	17.45	17.95	....
Vandergrift,Pa. U5	14.85	15.85	17.45	17.95	13.55
Warren,O. R2	....	....	....	....	13.55‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. §Coils, ¾-cent higher.

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.90	$8.15	$8.55
Dravosburg,Pa. U5	7.90	8.15	8.55
Fairfield,Ala. T2	8.00	8.25	8.65
FairlessHills,Pa. U5	8.00	8.25	8.65
Gary,Ind. U5	7.90	8.15	8.55
GraniteCity,Ill. G4	8.00	8.25	8.65
IndianaHarbor,Ind. I-2, Y1	7.90	8.15	8.55
Niles,O. R2	7.90	8.15	8.55
Pittsburg,Calif. C11	8.65	8.90	9.30
SparrowsPoint,Md. B2	8.00	8.25	8.65
Weirton,W.Va. W6	7.90	8.15	8.55
Yorkville,O. W10	7.90	8.15	8.55

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	6.575	....	....
Niles,O. R2	7.075	7.275	7.475

TINPLATE, American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$9.20	$9.45
Dravosburg,Pa.U5	9.20	9.45
Fairfield,Ala. T2	9.30	9.55
Fairless,Pa. U5	9.30	9.55
Gary,Ind. U5	9.20	9.45
Ind.Har. I-2, Y1	9.20	9.45
Pitts.,Calif. C11	9.95	10.20
Sp.Pt.,Md. B2	9.30	9.55
Weirton,W.Va. W6	9.20	9.45
Yorkville,O. W10	9.20	9.45

BLACK PLATE, (Base Box)

Aliquippa,Pa. J5 .....$7.00
Dravosburg,Pa. U5 ....7.00
Fairfield,Ala. T2 .....7.10
FairlessHills,Pa. U5 ....7.10
Gary,Ind. U5 .....7.00
GraniteCity,Ill. G4 ....7.10
Ind.Harbor,Ind. I-2, Y1 7.00
Niles, O. R2 .....7.00
Pittsburg,Calif. C11 ...7.75
SparrowsPoint,Md. B2 ..7.10
Warren,O. R2 .....7.00
Weirton,W.Va. W6 ....7.00
Yorkville,O. W10 .....7.00

HOLLOWARE ENAMELING Black Plate (29 Gage)

Dravosburg,Pa. U5 ....6.65
Gary,Ind. U5 .....6.65
GraniteCity,Ill. G4 ....6.75
Ind.Harbor,Ind. Y1 ....6.65
Yorkville,O. W10 .....6.65

MANUFACTURING TERNES (Special Coated; Base Box)

Dravosburg,Pa. U5 ...$8.70
Gary,Ind. U5 .....8.70

MANUFACTURING TERNES (Light Coated, 6 lb; Base Box)

Yorkville,O. W10 .....$9.15

ROOFING SHORT TERNES (8 lb Coated; Base Box)

Gary,Ind. U5 .....$10.25

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ..6.25
Aliquippa,Pa. J5 .....6.25
Alton,Ill. L1 .....6.425
Atlanta A11 .....6.45
Bartonville,Ill. K4 ....6.35
Buffalo W12 .....6.25
Chicago W13 .....6.25
Cleveland A7 .....6.25
Crawfordsville,Ind. M8..6.35
Donora,Pa. A7 .....6.25
Duluth,Minn. A7 .....6.25
Fairfield,Ala. T2 .....6.25
Fostoria,O.(24) S1 ....6.45
Houston S5 .....6.50
Jacksonville,Fla. M8 ...6.77
Johnstown,Pa. B2 .....6.25
Joliet,Ill. A7 .....6.25
KansasCity,Mo. S5 ....6.50
Kokomo,Ind. C16 .....6.35
LosAngeles B3 .....7.20
Minnequa,Colo. C10 ....6.50
Monessen,Pa. P7 .....6.25
Newark 6-8 ga. I-1 ....6.90
N.Tonawanda B11 .....6.25
Palmer,Mass. W12 ....6.55
Pittsburgh,Calif. C11 ...7.20
Portsmouth,O. P12 ....6.25
Rankin,Pa. A7 .....6.25
S.Chicago,Ill. R2 .....6.25
S.SanFrancisco C10 ....7.20
SparrowsPoint,Md. B2 ..6.35
Sterling,Ill.(1) N15 ....6.25
Sterling,Ill. N15 .....6.35
Struthers,O. Y1 .....6.25
Waukegan,Ill. A7 .....6.25
Worcester,Mass. A7 ....6.55

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5 .....7.90
Alton,Ill. L1 .....8.075
Bartonville,Ill. K4 ....8.00
Buffalo W12 .....7.90
Cleveland A7 .....7.90
Donora,Pa. A7 .....7.90
Duluth,Minn. A7 .....7.90
Fostoria,O. S1 .....7.95
Johnstown,Pa. B2 .....7.90
LosAngeles B3 .....8.85
Milbury,Mass.(12) N6 ..8.20
Minnequa,Colo. C10 ....8.15
Monessen,Pa. P16 .....7.90
Muncie,Ind. I-7 .....8.10
Palmer,Mass. W12 .....8.20
Pittsburg,Calif. C11 ...8.85
Portsmouth,O. P12 .....7.90
Roebling,N.J. R5 .....8.20
S.Chicago,Ill. R2 .....7.90
S.SanFrancisco C10 ....8.85
SparrowsPt.,Md. B2 ....8.00
Struthers,O. Y1 .....7.90
Trenton,N.J. A7 .....8.20
Waukegan,Ill. A7 .....7.90
Worcester A7,J4,T6,W12.8.20

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....7.60
Alton,Ill. L1 .....7.775
Buffalo W12 .....7.60
Cleveland A7 .....7.60
Donora,Pa. A7 .....7.60
Duluth,Minn. A7 .....7.60
Johnstown,Pa. B2 .....7.60
KansasCity,Mo. S5 ....7.85
LosAngeles B3 .....8.55
Minnequa,Colo. C10 ....7.775
Monessen,Pa. P16 .....7.60
NewHaven,Conn. A7 ....7.90
Palmer,Mass. W12 .....7.90
Pittsburg,Calif. C11 ....8.55
Portsmouth,O. P12 .....7.60
Roebling,N.J. R5 .....7.90
S.Chicago,Ill. R2 .....7.60
S.SanFrancisco C10 ....8.55
SparrowsPoint,Md. B2 ..7.70
Struthers,O. Y1 .....7.60
Trenton,N.J. A7 .....7.90
Waukegan,Ill. A7 .....7.60
Worcester,Mass. A7 ....7.90

WIRE, Fine & Weaving(8"Coils)

Alton,Ill. L1 .....12.725
Bartonville,Ill. K4 ....12.65
Buffalo W12 .....12.55
Chicago W13 .....12.55
Cleveland A7 .....12.55
Crawfordsville,Ind. M8.12.65
Fostoria,O. S1 .....12.55
Jacksonville,Fla. M8 ...13.08
Johnstown,Pa. B2 .....12.55
Kokomo,Ind. C16 .....12.55
Minnequa,Colo. C10 ....12.30
Monessen,Pa. P16 .....12.55
Muncie,Ind. I-7 .....12.75
Palmer,Mass. W12 .....12.85
Roebling,N.J. R5 .....12.85
S.SanFrancisco C10 ....12.90
Waukegan,Ill. A7 .....12.55
Worcester,Mass. A7,T6.12.85

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4 ....10.70
Buffalo W12 .....10.70
Johnstown,Pa. B2 .....10.70
Minnequa,Colo. C10 ..10.825
Monessen,Pa. P16 .....10.70
Muncie,Ind. I-7 .....10.90
Pittsburg,Calif. C11 ...11.50
Portsmouth,O. P12 .....10.70
Roebling,N.J. R5 .....11.00
SparrowsPt.,Md. B2 ....10.80

ROPE WIRE (A)

Bartonville,Ill. K4 ....10.55
Buffalo W12 .....10.55
Fostoria,O.(23) S1 .....10.55
Johnstown,Pa. B2 .....10.55
Monessen,Pa. P16 .....10.55
Muncie,Ind. I-7 .....10.75
Palmer,Mass. W12 .....10.85
Portsmouth,O. P12 .....9.75
Roebling,N.J. R5 .....10.85
SparrowsPt. B2 .....10.65
Struthers,O. Y1 .....10.55
Worcester,Mass. J4 ....10.85

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE

(Continued)

WIRE, Tire Bead

Bartonville,Ill. K4	14.15
Monessen,Pa. P16	14.20
Roebling,N.J. R5	14.35

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	9.00
Baltimore T6	9.30
Buffalo W12	9.00
Cleveland A7	9.00
Crawfordsville,Ind. M8	9.00
Dover,O. G6	9.00
Fostoria,O. S1	9.00
FranklinPark,Ill. T6	9.10
Kokomo,Ind. C16	9.00
Massillon,O. R8	9.00
Milwaukee C23	9.20
Monessen,Pa. P16	9.00
Pawtucket,R.I. N8	9.30
Riverdale,Ill. A1	9.10
Rome,N.Y. R6	9.00
Trenton,N.J. R5	9.30
Worcester A7, T6, W12	9.30

NAIL, Stock

To Dealers & Mfrs. (7)	Col.
AlabamaCity,Ala. R2	152
Aliquippa,Pa. J5	152
Atlanta A11	154
Bartonville,Ill. K4	154
Chicago,Ill. W13	152
Cleveland A9	157
Crawfordsville,Ind. M8	154
Donora,Pa. A7	152
Duluth,Minn. A7	152
Fairfield,Ala. T2	152
Galveston,Tex. D7	157
Houston,Tex. S5	157
Johnstown,Pa. B2	152
Joliet,Ill. A7	152
KansasCity,Mo. S5	157
Kokomo,Ind. C16	154
Minnequa,Colo. C10	157
Monessen,Pa. P7	152
Pittsburg,Calif. C11	171
Rankin,Pa. A7	152
S.Chicago,Ill. R2	152
SparrowsPt.,Md. B2	154
Sterling,Ill.(1) N15	152
Worcester,Mass. A7	158

NAILS, CUT (100 lb keg)

To Dealers (33)	
Conshohocken,Pa. A3	$9.05
Wheeling,W.Va. W10	9.05

STAPLES, Polished Stock

To Dealers & Mfrs. (7)	Col.
Aliquippa,Pa. J5	152
Atlanta A11	154
Bartonville,Ill. K4	154
Crawfordsville,Ind. M8	154
Donora,Pa. A7	152
Duluth,Minn. A7	152
Fairfield,Ala. T2	152
Johnstown,Pa. B2	152
Joliet,Ill. A7	152
Kokomo,Ind. C16	154
Minnequa,Colo. C10	157
Monessen,Pa. P7	152
Pittsburg,Calif. C11	171
Rankin,Pa. A7	152
SparrowsPt.,Md. B2	154
Sterling,Ill.(1) N15	152
Worcester,Mass. A7	158

TIE WIRE, Automatic Baler (14½ Ga.) (Per 97 lb Net Box)

Coil No. 3150	
AlabamaCity,Ala. R2	$9.35
Bartonville,Ill. K4	9.45
Buffalo W12	9.35
Crawfordsville,Ind. M8	9.46
Donora,Pa. A7	9.35
Duluth,Minn. A7	9.35
Johnstown,Pa. B2	9.35
Joliet,Ill. A7	9.35
Kokomo,Ind. C16	9.45
LosAngeles B3	10.14
Minnequa,Colo. C10	9.60
Pittsburg,Calif. C11	10.43
S.Chicago,Ill. R2	9.35
SparrowsPt.,Md. B2	9.45
Sterling,Ill. N15	9.35

Coil No. 6500 Stand.	
AlabamaCity,Ala. R2	$9.65
Bartonville,Ill. K4	9.75
Buffalo W12	9.60
Crawfordsville,Ind. M8	9.75
Donora,Pa. A7	9.65
Duluth,Minn. A7	9.65
Johnstown,Pa. B3	9.65
Joliet,Ill. A7	9.65
Kokomo,Ind. C16	9.75
LosAngeles B3	10.45
Minnequa,Colo. C10	9.90
Pittsburg,Calif. C11	10.13
S.Chicago Ill. R2	9.65
SparrowsPt.,Md. B2	9.75
Sterling,Ill. N15	9.65

Coil No. 6500 Interim	
AlabamaCity,Ala. R2	$9.70
Bartonville,Ill. K4	9.80
Buffalo W12	9.70
Crawfordsville,Ind. M8	9.80
Donora,Pa. A7	9.70
Duluth,Minn. A7	9.70
Johnstown,Pa. B2	9.70
Joliet,Ill. A7	9.70
Kokomo,Ind. C16	9.80
LosAngeles B3	10.50
Minnequa,Colo. C10	9.95
Pittsburg,Calif. C11	10.50
S.Chicago,Ill. R2	9.70
SparrowsPt.,Md. B2	9.80
Sterling,Ill. N15	9.70

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	175**
Aliquippa J5	172§
Atlanta A11	181
Bartonville,Ill. K4	181
Crawfordsville,Ind. M8	181
Donora,Pa. A7	175†
Duluth,Minn. A7	175†
Fairfield,Ala. T2	175†
Houston Tex. S5	180†
Johnstown,Pa. B2	179*
Joliet,Ill. A7	175†
KansasCity,Mo. S5	180†
Kokomo,Ind. C16	177†
Minnequa,Colo. C10	180**
Monessen,Pa. P7	179*
Pittsburg,Calif. C11	195†
Rankin,Pa. A7	175†
S.Chicago,Ill. R2	175**
S.SanFrancisco C10	195**
SparrowsPoint,Md. B2	181*
Sterling,Ill.(1) N15	179*

WOVEN Fence, 9-15 ga. Col.

Ala.City,Ala. R2	162**
Ala.City, 17 ga. R2	241**
Ala.City, 18 ga. R2	251**
Aliq'ppa,Pa.9-14½ga J5	165§
Atlanta A11	168
Bartonville,Ill. K4	168
Crawfordsville,Ind. M8	168
Donora,Pa. A7	162†
Duluth,Minn. A7	162†
Fairfield,Ala. T2	162†
Houston,Tex. S5	167†
Johnstown,Pa.(43) B2	166
Joliet,Ill. A7	162†
KansasCity, Mo. S5	167†
Kokomo,Ind. C16	164†
Minnequa,Colo. C10	167**
Monessen,Pa. 9 ga. P17	166*
Pittsburg,Calif. C11	185†
Rankin,Pa. A7	162†
S.Chicago,Ill. R2	162**
Sterling,Ill.(1) N15	166*

Wire (16 Gage) Stone	An'ld Galv. Stone
Ala.City R2	14.50 16.05**
Bartonville K4	14.60 16.50
Buffalo W12	14.50
Cleveland A7	14.50
Crawf'dsville M8	14.60 16.50
Fostoria,O. S1	14.60 16.15†
Johnstown B2	14.15 16.40*
Kokomo C16	14.60 16.15†
Minnequa C10	14.75 16.45**
Palmer,MassW12	14.50 16.05*
Pitts.,Calif. C11	14.85 16.40†
S.Chicago R2	14.50 16.05**
SparrowsPt. B2	14.60 16.50*
Sterling(1) N15	14.50 16.45††
Waukegan A7	14.50 16.05†
Worcester A7	14.80

WIRE, Merchant Quality (6 to 8 gage) An'ld Galv.

Ala.City,Ala. R2	7.40 7.80**
Aliquippa J5	7.40 7.925§
Atlanta A11	7.50 8.075
Bartonville(48) K4	7.50 8.075
Buffalo W12	7.40 8.80†
Cleveland A7	7.40
Crawfordsville M8	7.50 8.075
Donora,Pa. A7	7.40 7.80†
Duluth,Minn. A7	7.40 7.80†
Fairfield T2	7.40 7.80†
Houston,Tex. S5	7.65 8.05†
Jacks'ville,Fla.M8	7.90 8.475
Johnstown B2(48)	7.40 7.975*
Joliet,Ill. A7	7.40 7.80†
KansasCity,Mo. S5	7.65 8.05†
Kokomo C16	7.50 7.90†
LosAngeles B3	8.35 8.925*
Minnequa C10	7.65 8.05**
Monessen P7 (48)	7.40 7.975*
Palmer,Mass. W12	7.70 8.10†
Pitts.,Calif. C11	8.35 8.75†
Portsmouth,O. P12	7.40
Rankin A7	7.40 7.80†
S.Chicago R2	7.40 7.80**
S.SanFran. C10	8.35 8.75**
Spar'wsPt.B2(48)	7.50 8.075*
Str'ling(1)(48)	N15 7.40 8.00††
Struthers,O.(48)	Y1 7.40 7.90†
Worcester,Mass.	A7 7.70

*Based on 12.50c zinc; †5c zinc; §10c zinc; ‡Less than 10c zinc; **Subject to zinc equalization extras. ††13c zinc.

FASTENERS

(Base discounts, full case quantity, per cent off list to consumer, f.o.b. mill)

Carriage, Machine Bolts

Full-Size Body (cut thread)
- †½" x 6" and smaller 61
- Larger than ½" diam. and all diams. longer than 6" 55

Under-Size Body (rolled thread; not nutted):
- ½" x 6" and smaller. 61

NUTS

Reg. & Heavy Square Nuts, all sizes 61

H. P. Reg. & Heavy Hex Nuts:
- ¾" & smaller 64
- ⅞" to 1¼" incl. 63
- 1⅛" to 1½" incl. 65
- 1⅝" & larger 61

C.P. Reg. & Heavy Hex Nuts
- ¾" & smaller 64
- ⅞" & larger 61

Semifinished & Finished Nuts
- ¾" & smaller 66
- ⅞" & larger 63

Semifinished Slotted Reg. & Heavy Hex Nuts
- ¾" & smaller 66
- ⅞" & larger 63

Hot Galvanized Nuts, all types
- 1⅛" & smaller 44

(On above items, add 25% for less than case quantities)

CAP SCREWS

(New Std., hexagon head, unset, packages)

Bright:

6" and shorter:
- ¼" through ½" diam. 34
- ⅝" & ¾" diam. 31
- ⅞", ⅞", 1" 8

Longer than 6"
- ¼" through ¾" diam. 3
- ⅞" through 1" diam. +13

High Carbon, Heat-treated:

6" and shorter:
- ¼" through ½" diam. 20
- ⅝" & ¾" diam. 16
- ⅞", ⅞", 1" +11

Longer than 6"
- ¼" through ¾" diam. +23
- ⅞" through 1" diam. +41

(New Std. Hexagon head, upset, bulk)

Bright:
- ½" x 6" & smaller & shorter 49
- ⅝" & ¾" diam. x 6" & shorter 48
- ⅞", ⅞", 1" x 6" & shorter 31

High Carbon, Heat-treated:
- ½" x 6" & smaller & shorter 41
- ⅝" x ¾" diam. & 6" & shorter 39
- ⅞", ⅞", 1" x 6" & shorter 20

MACHINE SCREW NUTS & STOVE BOLT NUTS (Bulk)

No. 2 to ¾" incl., Square:
- 25,000 to 199,999 pieces 20
- 200,000 or more pieces 27

No. 2 to ¾" incl., Hex.:
- 25,000 to 199,999 pieces 18
- 200,000 or more pieces 25

MACHINE SCREWS, SLOTTED (Bulk)

No. 2 to ¼" diam. incl.:
- 25,000 to 199,999 pieces 20
- 200,000 or more pieces 27

⅜" to ½" diam. incl.:
- 15,000 to 99,999 pieces 20
- 100,000 or more 27

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	21.06	20.42
1¼	13	....	24.94	20.45
1½	13	23.31	27.57	22.61
1¾	13	27.54	32.57	26.71
2	13	30.87	36.51	29.93
2¼	13	34.77	41.12	33.72
2½	12	37.73	44.63	36.60
2½	12	41.57	49.16	40.31
2¾	12	45.00	53.22	43.65
3	12	47.99	56.76	46.55

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Standard No. 2	Tee Rails All 60 lb Under
RAILS				
Bessemer,Pa. U5	4.725	4.625	4.675	5.65
Ensley,Ala. T2	4.725	4.625	....	5.65
Fairfield,Ala. T2	....	....	....	5.65
Gary,Ind. U5	4.725	....	....	....
Huntington,W.Va. W7	....	....	....	5.65
IndianaHarbor,Ind. I-2	4.725	4.625	4.675	....
Johnstown,Pa. B2	....	....	....	(16)5.65
Lackawanna,N.Y. B2	4.725	4.625	....	5.65
Minnequa,Colo. C10	4.725	4.625	....	6.15
Steelton,Pa. B2	4.725	4.625	....	....
Williamsport,Pa. S19	....	....	....	5.65

TIE PLATES

Fairfield,Ala. T2	5.625
Gary,Ind. U5	5.625
Ind.Harbor,Ind. I-2	5.625
Lackawanna,N.Y. B2	5.625
Minnequa,Colo. C10	5.625
Seattle B3	5.775
Steelton,Pa. B2	5.625
Torrance,Calif. C11	5.775

TRACK BOLTS (20) Treated

Cleveland R2	12.40
KansasCity,Mo. S5	12.40
Lebanon,Pa. B2	12.40
Minnequa,Colo. C10	12.40
Pittsburgh O3, P14	12.40
Seattle B3	12.90

AXLES

Ind.Harbor,Ind. S13	7.25
Johnstown,Pa. B2	7.25

JOINT BARS

Bessemer,Pa. U5	5.825
Fairfield,Ala. T2	5.825
Ind.Harbor,Ind. I-2	5.825
Joliet,Ill. U5	5.825
Lackawanna,N.Y. B2	5.825
Minnequa,Colo. C10	5.825
Steelton,Pa. B2	5.825

SCREW SPIKES

Cleveland R2	11.90
Pittsburgh O3	11.90

STANDARD TRACK SPIKES

Fairfield,Ala. T2	7.90
Ind.Harbor,Ind. I-2, Y1	7.90
KansasCity,Mo. S5	7.90
Lebanon,Pa. B2	7.90
Minnequa,Colo. C10	7.90
Pittsburgh J5	7.90
Seattle B3	8.40
S.Chicago,Ill. R2	7.90
Struthers,O. Y1	7.90
Youngstown R2	7.90

METAL POWDER

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

	Cents
Sponge iron: 98+% Fe, annealed.	9.25
Unannealed: Minus 100 mesh	11.75
Minus 35 mesh	8.25
Minus 20 mesh	9.00
Swedish, c.l.f. Camden, N. J., c.l. in bags.	9.50
Domestic (Swedish), f.o.b. Riverton, N.J., in bags	9.50
Canadian, fo.o.b. Shipping point	9.50
Electrolytic iron: Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in.	22.00
Annealed, 99.5% Fe.	36.50
Unannealed (99+% Fe)	34.00
Unannealed (99+% Fe) (minus 325 mesh)	57.00
Powder Flakes (minus 16, plus 100 mesh)	31.00
Carbonyl Iron: 97.9-99.8% size 5 to 10 microns	83.00-148.00
Aluminum: Atomized, 500 lb. drum frght. allowed	
Carlots	34.50
Ton lots	36.50
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	38.00-50.00†
Bronze, 5000-lb lots	61.25-64.50†
Copper: Electrolytic	56.75
Reduced	56.75
Lead	22.80
Manganese: Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	$1.00
Nickel-Silver, 5000-lb lots	58.75-61.50†
Phosphor-Bronze, ¼-ton lots	58.50
Silicon	47.50
Solder	7.00*
Stainless Steel, 302	99.00
Stainless Steel, 316	$1.32
Tin	14.50*
Zinc, 5000-lb lots	18.75-32.50‡

Tungsten	Dollars
Melting grade, 99% 60 to 200 mesh: 1000 lb and over	4.50
Less than 1000 lb	4.65
Chromium, electrolytic 99.2% Cr min.	3.50

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 30% Zn, 10% Ni, **64% Cu, 18% Zn, 18% Ni.

Footnotes

(1) Chicago Base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 Ga. and heavier.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ¾" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25 off for untreated.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(23) Mild plow, 10.55c.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 5.25c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill and 0.45c for carbon, add 0.40c for alloy and 0.45c H.S.-L.A.
(31) Widths over ⅝-in.; 6.90c for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 13 Ga. & heavier; 60" & narrower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.25c.
(43) 9-14½ Ga.
(44) 6-7 Ga.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25
Ambridge, Pa. N2	6.5	..	10.5	...	13	...	14.5	...	14.5	...	14	...	16.5	...
Lorain, O. N3	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25
Youngstown Y1	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Alton, Ill. L1	...	...	....	....	....	....	15.5	+1.75	18.5	2.25	21	5.75	23.5	7
Benwood, W. Va. W10	16.5	+12	7.25	+18.25	+1.75	+26.25	17.5	0.25	20.5	4.75	23	7.75	25.5	7
Butler, Pa. F6	17.5	+11	9	+16.5	0.5	+24	...	...	...	...	...	...	...	...
Etna, Pa. N2	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Fairless Hills, Pa. N3	...	...	....	....	....	....	15.5	+1.75	18.5	2.75	21	5.75	23.5	7
Fontana, Calif. K1	...	...	....	....	....	....	6	+11.25	9	+7.25	11.5	+3.75	14	+2.5
Ind. Harbor, Ind. Y1	...	...	....	....	....	....	16.5	+0.75	19.5	3.25	22	6.75	24.5	8
Lorain, O. N3	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Sharon, Pa. S4	17.5	+11	9	+16.5	0.5	+24	...	...	...	...	...	...	...	...
Sharon, Pa. M6	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Sparrows Pt., Md. B2	15.5	+13	7	+18.5	+1.5	+26	15.5	+1.75	18.5	2.25	21	5.75	23.5	7
Youngstown R2, Y1	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Wheatland, Pa. W9	17.5	+11	9	+16.5	0.5	+24	17.5	0.25	20.5	4.25	23	7.75	25.5	9

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	26	10	26.5	10.5	28	10.75	28	10.75	....	...	....	...
Alton, Ill. L1	24	8	24.5	8.5	26	8.75	26	8.75	....	...	....	...
Benwood, W. Va. W10	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5	0.75
Etna, Pa. N2	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5	0.75
Fairless Hills, Pa. N3	24	8	24.5	8.5	26	8.75	26	8.75	16.5	+1.25	16.5	+1.25
Fontana, Calif. K1	14.5	+1.5	15	+1	16.5	+0.75	16.5	+0.75	7	+10.75	7	+10.75
Ind. Harbor, Ind. Y1	25	9	25.5	9.5	27	9.75	27	9.75	17.5	+0.25	17.5	+0.25
Lorain, O. N3	26	10	26.5	10.5	28	10.75	28	10.75	....	...	....	...
Sharon, Pa. M6	26	10	26.5	10.5	28	10.75	28	10.75	....	...	....	...
Sparrows Pt., Md. B2	24	8	24.5	8.5	26	8.75	26	8.75	16.5	+1.25	16.5	+1.25
Youngstown R2, Y1	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5	0.75
Wheatland, Pa. W9	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5	0.75

*Galvanized pipe discounts based on current price of zinc (13.00c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling Ingots	Rerolling Slabs, Billets	Forging Billets	Seamless Tube Billets	H.R. Strip	Shapes; H.R. & C.F. Bars; Wire	Plates	Sheets	C.R. Strip; Flat Wire
201	17.00	21.50	....	....	31.00	....	....	42.25	39.00
202	18.25	24.00	31.00	36.25	33.50	36.75	38.75	42.50	42.50
301	17.75	22.25	....	36.75	32.00	38.00	....	44.25	41.00
302	19.00	24.75	32.00	37.25	34.50	38.25	40.25	44.50	44.50
302B	20.25	26.50	33.00	37.25	37.75	38.25	40.25	47.00	47.00
303	....	26.75	34.75	40.00	....	41.00	....	....	....
304	20.25	26.00	33.75	39.00	37.25	40.25	43.00	47.25	47.25
304L	....	....	38.75	44.00	42.25	45.25	48.00	52.25	52.25
305	21.75	28.25	....	39.50	40.25	40.25	43.50	50.25	50.25
308	22.00	29.00	38.50	44.25	41.25	45.50	49.75	52.00	52.00
309	29.50	38.25	46.75	53.50	53.50	54.75	58.25	67.00	67.00
309S	31.50	41.00	51.00	59.00	58.50	60.25	63.75	74.00	74.00
310	37.25	48.00	62.25	72.25	68.50	73.50	75.25	78.75	78.75
314	....	....	....	....	....	....	75.25	....	....
316	31.50	40.25	51.25	59.50	58.25	60.75	64.00	68.25	68.25
316L	....	....	56.25	64.75	63.25	65.75	69.25	73.25	73.25
317	37.25	48.25	62.75	72.75	73.50	74.50	77.00	83.75	83.75
321	25.00	32.00	38.25	44.00	44.25	45.25	49.25	54.25	54.25
18-8CbTa	29.25	38.00	45.75	52.25	53.25	53.50	58.00	66.50	66.50
403	....	....	28.75	32.75	....	34.00	36.25	....	44.00
405	17.50	23.00	26.75	31.00	32.25	32.00	33.75	42.25	42.25
410	15.00	19.50	25.50	29.50	28.00	30.50	31.75	36.25	36.25
416	....	....	26.00	30.00	....	31.00	....	....	....
420	23.50	30.25	31.00	36.00	37.75	37.25	40.75	56.00	56.00
430	15.25	19.75	26.00	30.00	28.75	31.00	32.25	36.75	36.75
430F	....	....	26.50	30.50	....	31.50	....	....	....
431	16.00	20.50	26.50	30.50	29.75	31.50	33.00	38.00	38.00
446	....	....	35.50	40.50	53.25	42.00	43.25	63.25	63.25

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Ellwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Tube Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co., Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	Plates, Carbon Base 10%	Plates, Carbon Base 20%	Sheets, Carbon Base 20%
Stainless:			
302	....	....	30.50
304	30.30	36.05	32.50
304-L	32.30	37.95	....
310	41.30	47.00	....
316	35.50	41.40	47.00
316-L	40.00	46.10	....
316-CB	41.15	48.45	....
321	32.00	37.75	37.25
347	34.40	41.40	48.25
405	25.80	33.35	....
410	25.30	32.85	....
430	25.30	32.85	....
Inconel	49.45	65.45	....
Nickel	41.05	55.65	....
Nickel, Low Carbon	43.25	60.05	....
Monel	42.35	56.35	....
Copper*	....	....	46.00

	Strip, Carbon Base, Cold Rolled 10%	Strip, Carbon Base, Cold Rolled Both Sides
Copper*	30.00	38.00

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.275	5%Cr Hot Work	0.430-0.460
Extra Carbon	0.330	W-Cr Hot Work	0.450
Special Carbon	0.390	V-Cr Hot Work	0.470
Oil Hardening	0.430	Hi-Carbon-Cr	0.770

Grade by Analysis (%)

W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	...	4.090
18.25	4.25	1	4.75	...	2.305-2.475
18	4	2	9	...	2.675-2.6775
18	4	2	....	...	1.765
18	4	1	....	...	1.600
13.75	3.75	2	5	...	2.245
13.5	4	3	....	...	1.865
9	3.5	..	....	...	1.180
6	4	2	....	5	1.105
6	4	3	....	6	1.350
1.5	4	1	....	8.5	0.960

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, M14, S8, U4, V2 and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

Birmingham District	Basic	No. 2 Foundry	Malleable	Bessemer
AlabamaCity,Ala. R2	54.50	55.00‡	....	....
Birmingham R2	54.50	55.00‡	....	....
Birmingham U6	....	55.00‡	59.00	....
Woodward,Ala. W15	54.50	55.00‡	59.00	....
Cincinnati, deld.	....	62.70	....	....
Buffalo District				
Buffalo H1, R2	58.50	59.00	59.50	60.00
Tonawanda,N.Y. W12	58.50	59.00	59.50	60.00
N.Tonawanda,N.Y. T9	....	59.00	59.50	60.00
Boston, deld.	69.15	69.65	70.15	....
Rochester,N.Y. deld.	61.52	62.02	62.52	....
Syracuse,N.Y. deld.	62.62	63.12	63.62	....
Chicago District				
Chicago I-3	58.50	59.00	59.00	59.50
Gary,Ind. U5	58.50	....	59.00	....
S.Chicago R2	58.50	....	59.00	....
S.Chicago,Ill. Y1	58.50	59.00	59.00	59.50
S.Chicago,Ill. U5, W14	58.50	....	59.00	59.50
Milwaukee, deld.	60.67	61.17	61.17	61.67
Muskegon,Mich. deld.	....	65.30	65.30	....
Cleveland District				
Cleveland A7, R2	58.50	59.00	59.00	59.50
Akron,O., deld.	61.25	61.75	61.75	62.25
Lorain,O. N3	58.50	....	....	59.50
Mid-Atlantic District				
Bethlehem,Pa. B2	60.50	61.00	61.50	62.00
NewYork, deld.	....	64.78	65.28	....
Newark, deld.	63.52	64.02	64.52	65.02
Birdsboro,Pa. B10	60.50	61.00	61.50	62.00
Chester,Pa. P14	60.50	61.00	61.50	....
Philadelphia, deld.	62.16	62.66	63.16	....
Steelton,Pa. B2	60.50	61.00	61.50	62.00
Swedeland,Pa. A3	60.50	61.00	61.50	62.00
Philadelphia, deld.	62.16	62.66	63.16	63.66
Troy,N.Y. R2	60.50	61.00	61.50	62.00
Pittsburgh District				
NevilleIsland,Pa. P6	58.50	59.00	59.00	....
Pittsburgh (N&S sides), Aliquippa, deld.	....	60.37	60.37	60.87
McKeesRocks, deld.	....	60.04	60.04	60.54
Lawrenceville,Homestead, Wilmerding, Monaca, deld.	....	60.66	60.66	61.16
Verona,Trafford, deld.	60.69	61.19	61.19	61.69
Brackenridge, deld.	60.95	61.45	61.45	61.95
Bessemer,Pa. U5	58.50	....	59.00	59.50
Clairton,Rankin,S.Duquesne,Pa. U5	58.50	....	....	....
McKeesport,Pa. N3	58.50	....	....	59.50
Midland,Pa. C18	58.50	....	....	....

Youngstown District	Basic	No. 2 Foundry	Malleable	Bessemer
Hubbard,O. Y1	....	....	59.00	....
Sharpsville,Pa. S6	58.50	....	59.00	59.50
Youngstown Y1	....	....	59.00	59.50
Youngstown U5	58.50	....	....	59.50
Mansfield,O., deld.	63.40	....	63.90	64.40
Duluth I-3	58.50	59.00	59.00	59.50
Erie,Pa. I-3	58.50	59.00	59.00	59.50
Everett,Mass. E1	62.00	62.50	63.00	....
Fontana,Calif. K1	64.50	65.00	....	....
Geneva,Utah C11	58.50	59.00	....	....
GraniteCity,Ill. G4	60.40	60.90	61.40	....
Ironton,Utah C11	58.50	59.00	....	....
LoneStar,Texas L6	....	55.00*	....	....
Minnequa,Colo. C10	60.50	61.00	61.50	....
Rockwood,Tenn. T3	....	55.00‡	59.00	....
Toledo,O. I-3	58.50	59.00	59.00	59.50
Cincinnati, deld.	64.26	64.76	....	....

*Phos. 0.51-0.75%; $56, Phos. 0.31-0.50%.
‡Intermediate (Phos. 0.31-0.60%), $56.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.
Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.
Nickel: Under 0.05% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.5% Si; 75 cents for each 0.50% Mn over 1%)

Jackson,O. G2, J1	$67.50
Buffalo H1	68.75

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

NiagaraFalls,N.Y. P15	$85.50
Keokuk,Iowa, (Open-hearth & Fdry, freight allowed K2)	90.00
Keokuk, O.H. & Fdry, 12½ lb pigiets, 16% Si, frgt allowed K2	93.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$72.50
Steelton,Pa. B2 (Phos. 0.035% max)	66.50
Philadelphia, deld.	70.05
Troy,N.Y. R2 (Phos. 0.035% max)	66.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	63.50
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	63.50
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	63.50

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 25 cents per 100 lb except: Buffalo, Cleveland, Erie, 30 cents; Moline, Norfolk, Richmond, Washington, 20 cents; Birmingham, Chattanooga, Jackson, 15 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, San Francisco, 10 cents; Atlanta, Houston, Seattle, Spokane, no charge.

	SHEETS				STRIP		BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Galv. 10 Ga.†	Stainless Type 302	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.§	H.R. Alloy 4140††§		Carbon	Floor
Atlanta	7.14	8.20	8.87	....	7.40	...	7.42	9.39	....	7.63	7.49	9.48
Baltimore	7.03	8.32	8.37	....	7.65	...	7.61	8.62§	13.44	7.93	7.21	8.87
Birmingham	6.80	7.90	8.85	....	7.06	...	7.08	9.35	....	7.28	6.99	9.10
Boston	7.70	8.81	10.27	45.67	7.96	...	7.83	9.53	14.45	8.13	7.89	9.36
Buffalo	6.80	8.05	9.77	....	7.15	...	7.10	7.90	13.10	7.40	7.15	8.79
Chattanooga	6.95	8.10	8.60	....	7.20	...	7.20	9.18	....	7.45	7.25	9.05
Chicago	6.80	8.09	8.50	49.05	7.06	...	7.08	7.75	12.85	7.28	6.99	8.46
Cincinnati	6.92	8.08	8.90	46.10	7.30	...	7.32	8.05	13.09	7.75	7.28	8.71
Cleveland	6.80	8.09	8.85	49.16	7.16	...	7.14	7.85	12.91	7.61	7.16	8.63
Detroit	6.99	8.28	8.78	43.50	7.34	...	7.36	8.04	13.05	7.75	7.27	8.65
Erie, Pa.	6.80	7.90	8.85	....	7.15	...	7.08	7.85	....	7.40	7.15	8.63
Houston	7.85	8.75	10.49	....	8.15	...	8.25	9.85	14.00	8.20	7.80	9.20
Jackson, Miss.	7.10	8.20	9.20	....	7.40	...	7.40	9.44	....	7.69	7.45	9.30
Los Angeles	8.05	10.00	11.00	....	8.35	...	8.05	11.25	14.25	8.30	8.05	10.25
Milwaukee	6.89	8.18	8.59	....	7.15	...	7.17	7.94	12.94	7.45	7.08	8.55
Moline, Ill.	7.15	8.44	8.85	....	7.41	...	7.43	8.10	....	7.63	7.34	...
New York	7.46	8.68	9.44	44.95	8.07	...	7.96	9.48	13.28	7.99	7.76	9.19
Norfolk, Va.	7.25	...	...	....	7.65	...	7.65	9.50	....	7.95	7.45	8.95
Philadelphia	7.14	8.42	9.35	45.98	7.67	9.02	7.64	8.46	13.16	7.74	7.37	8.69**
Pittsburgh	6.80	8.09	9.20	49.00	7.16	...	7.08	7.85	12.85	7.28	6.99	8.46
Portland, Oreg.	7.80	8.80	10.65	....	8.00	...	7.95	12.20	15.00	7.85	7.75	9.60
Richmond, Va.	7.00	...	9.47	....	7.65	...	7.70	8.85	....	7.95	7.20	9.10
St. Louis	7.09	8.38	9.19	43.89	7.35	...	7.37	8.14	13.14	7.68	7.28	8.75
St. Paul	7.46	8.59	9.16	....	7.72	...	7.74	8.51	13.51	7.94	7.65	9.12
San Francisco	8.10	9.65	10.15	51.65	8.35	...	8.05	11.20	14.25§	8.25	8.05	10.25
Seattle	8.55	10.40	10.80	54.00	8.65	...	8.35	11.70	14.60	8.30	8.20	10.10
Spokane	8.55	11.00†	10.80	....	9.05	...	8.35	11.80	15.35	8.30	8.20	10.60
Washington	7.50	8.79	7.97	....	8.12	...	8.08	9.09	....	8.40	7.68	9.34

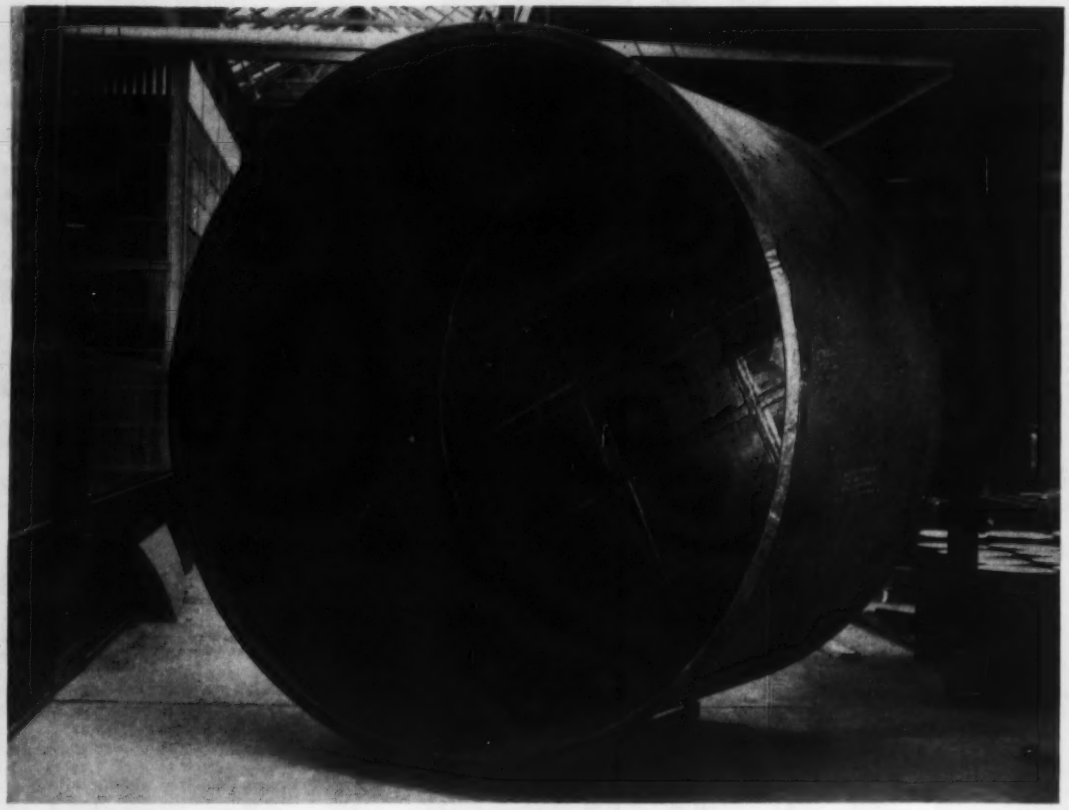
Prices do not include gage extras; †prices include gage and coating extras (based on 12.50-cent zinc), except in Birmingham (coating extra excluded); ‡includes 35-cent special bar quality extras; **⅛-in. and heavier; ††as annealed; §§under ½-in.

Base quantities, 2000 to 4999 lb except as noted; Cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York and Boston, 10,000 lb, and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; §—500 to 9999 lb; §—400 to 999 lb; §—4000 lb and over; §—1000 to 1999 lb; §—1000 lb and over; †—1500 to 3999 lb; §—2000 to 3999 lb; §—f.o.b. local delivery in lots of 10,000 lb and over.

HERECROL

REG. U. S. PAT. OFF.

Self-curing SYNTHETIC RUBBER SHEET LINING



The CARBON STEEL TANK shown above was HERECROL lined in our shops and later installed in a Wisconsin Paper Mill for liquid alum storage. HERECROL Sheet Lining is available in ⅛" and 3/16" thickness. Application may be accomplished in the field as well as in our shop. The following is a selection of solutions which can safely be handled in HERECROL lined equipment:

ALUM SOLUTIONS • AMMONIA SOLUTIONS
COPPER SULFATE • FERRIC SULFATE
HYDROCHLORIC ACID • HYDROFLUORIC ACID
NITRIC ACID • SODIUM HYDROXIDE
PHOSPHORIC ACID • NICKEL SULFATE
ZINC CHLORIDE • ZINC SULFATE

The HERECROL Self-Curing Synthetic Rubber Sheet Lining can be applied to steel tanks and other equipment unlimited in size. The reason for this is that no special equipment to provide heat or pressure is required. Storage tanks, processing vessels, tank cars, trailer tanks, pipes, fans, blowers, and duct systems have been successfully processed.

HERESITE & CHEMICAL COMPANY

Manitowoc, Wisconsin

Branch Office: 327 South LaSalle Street, Chicago, Illinois

"Enough for any steel expansion," dealers say as . . .

Scrap Reserves Grow

"THE MINE above the earth" contains enough scrap to take care of any projected expansion of steel capacity.

That's the finding of a preliminary survey made by the National Federation of Independent Scrap Yard Dealers Inc., New York.

Dimensions—It estimates that the total amount of steel in use in the U. S. is some 1.6 billion tons, of which about 48 million tons becomes available as potential scrap every year.

The steel industry's scrap consumption averages out at about 50 per cent of its total melt. Steel takes care of about half its needs with "home" scrap. The remainder must come from the open market. In 1953, steelmakers consumed 32 million gross tons of open market scrap, of which 10 million tons came from new industrial scrap. Just 22 million gross tons had to be dug from the "mine."

Outlook—Based on the current consumption rate, the federation estimates: When the steel industry has expanded to a capacity of 150 million tons, only about 25 million tons of scrap will have to be mined.

Adds the federation: "This does not take into account new steel tonnage being put in use. At present production rates, this addition to scrap reserves is estimated as high as 70 million gross tons a year." Conclusion: The scrap reservoir, far from being drained, is swelling at a rate of at least 40 million tons a year.

Plea—The federation is renewing its 1954 petition to have the government make a thoroughgoing study of the scrap situation. It met with Arthur S. Flemming, director, Office of Defense Mobilization, earlier this month. It points out that the $2-billion-a-year scrap industry is a vital part of the nation's defense potential, and asks that resources be studied just as they have been for iron ore and other primary industrial materials.

The federation suggests the Bureau of Mines or the Office of Minerals Mobilization as two agencies qualified to make the analysis. It also puts forward the following outline as basis for study: The amount of iron and steel in use in the scrap reservoir; the average life of that steel; the potential tonnage available annually by uses and sources; annual tonnage added to the reservoir; tonnage lost through rust and other causes; incentives and conservation aspects.

One of the technical developments that may come in the future steel expansion—increased reliance on the oxygen converter—could put new pressure on our scrap resources. One way to get a large steel capacity increase with relatively low capital expenditure is to team the oxygen converter with a blast cupola, which produces pig iron from a 100-per-cent scrap steel charge.

Imported Steel Prices Rise

Import prices on most major steel products from Western Europe continue to increase. Markups range from 10 to 55 cents per 100 lb, the latter applying to hot rolled sheets.

An important exception is plates. Prices are unchanged, but already are $50 a ton or so higher than the general domestic market. Plate deliveries are far extended. So this product is not attracting quite the interest that might be expected in the light of the severe supply shortage.

Prices on furring channels and bright common wire nails are unchanged. Barbed wire is off 5 cents per 100 lb. Prices on oil country pipe are largely nominal, with delivery promises ranging five to six months.

Deliveries on bar-sized angles, structural angles and wide flange beams range three to four months; also merchant bars. Merchant wire products average around six to eight weeks; furring channels, four weeks. Delivery promises on wire rods are well extended, five months in some cases.

Despite the shortages in this country, foreign deliveries on plates, shapes, bars and sheets are not heavy. Volume, however, is increasing.

Wire . . .

Wire Prices, Pages 144 & 145

Heavy demand for finished wire is reflected in rising backlogs in most grades. With consumer inventories generally below normal and

Steel Import Prices

(Base per 100 lb, landed, duty paid. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A-305	$6.60	$6.60	$6.60	$7.00
Bar Size Angles	6.50	6.50	6.50	6.90
Structural Angles	6.50	6.50	6.50	6.90
I-Beams	6.50*	6.50*	6.50*	6.90*
Wide Flange Beams	6.50*	6.50*	6.50*	6.90*
Plates	6.95	6.95	6.95	7.35
Sheets, H.R.	8.00	8.00	8.00	8.40
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	28.43	28.43	28.43	30.26
Barbed Wire (†)	5.90	5.90	5.90	6.23
Merchant Bars	6.60	6.60	6.60	7.00
Hot-Rolled Bands	6.60	6.60	6.60	7.00
Wire Rods, Thomas Commercial No. 5	6.05	6.05	6.05	6.45
Wire Rods, O-H Cold Heading Quality No. 5	6.70	6.70	6.70	7.10
Bright Common Wire Nails	7.65	7.65	7.65	8.05

Oil Country Pipe: Prices on all sizes equalized with Pittsburgh plus barge freight to New Orleans and Houston, where available.

*Nominal. †Per 82-lb. net, reel. ‡Per 100-lb kegs, 20d nails and heavier.

consumption sustained at a high level, forward buying is more in evidence.

In New England, only demand for fine wire grades is lagging. Spring and upholstery coil requirements are in excess of earlier liberal estimates, notably on automotive account.

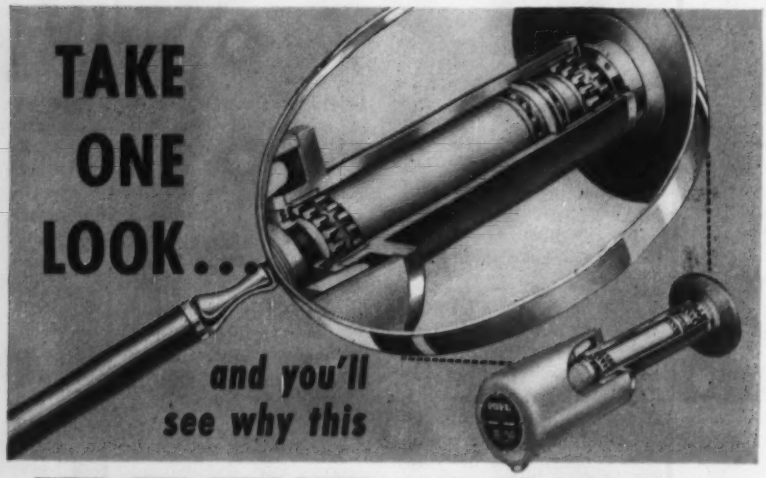
Valve and piston ring volume will reach a new high this year, with first quarter production capacity well filled. The same holds for heavier starter springs. For bedsprings and mattresses, an estimated 135,000 tons of hard-drawn 0.50 to 0.60 carbon wire will go into spiral coils.

Hard pressed rod supply will be eased partially by resumption of operations at a rehabilitated Buffalo mill.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 142

Reinforcing steel suppliers are booked solid, four to six months ahead in the Chicago district. Their inventories are hand to mouth. Most bookings are jobs of substantial size, with industrial construction and road work predominating. The only reinforcing product relatively easy to obtain is welded wire mesh.



POPE PRECISION SPINDLE

means finer finishes at lower cost

Look at the super precision double row cylindrical roller bearings and separate thrust bearings, an exclusive feature found only in Pope Spindles.

You won't find bearings like these in other makes of spindles.

The bearings and shafts in Pope Spindles have tremendous load carrying capacity for crush dressing and form grinding. They produce superior, low micro-inch finishes, and assure long, trouble-free operation. There can be *no endwise movement of shafts in either direction.* Operation is always cool. Pope System lubrication is good for the life of the bearings.

YOU CAN SPECIFY POPE SPINDLES WITH CONFIDENCE

Write for Catalog 60A covering the complete range from 1 HP to 15 HP in standard Pope Spindles.

106

Specify POPE PRECISION SPINDLES

POPE MACHINERY CORPORATION
Established 1920
261 RIVER STREET · HAVERHILL, MASSACHUSETTS

BUILDERS OF THE REVOLUTIONARY NEW POPE SUPER-PRECISION BORING MACHINE THAT BORES HOLES ROUND WITHIN MILLIONTHS OF AN INCH

Sheets, Strip . . .

Sheet & Strip Prices, Pages 143 & 144

There is some question whether hot rolled is in tighter supply than cold-rolled sheets. But there is no doubt that both grades are hard for consumers to get.

Producers in opening their books on tonnage for shipment after the turn of the year did so for whatever space they will have available after carry-overs are taken care of. Some producers are so far in arrears it is unlikely more than a month to six weeks of first quarter production will be open to apply against new bookings.

At Pittsburgh, it is reported nonintegrated mills are having difficulty getting all of the semifinished steel they need to maintain sheet and strip operations. A bottleneck is forming in hot-rolled sheets. Contributing to the shortage in flat-rolled is the elimination of two antiquated strip mills by Wierton Steel Co., Weirton, W. Va. Eventually, sheet production at that point will be increased through the company's three-year expansion program. For the short term, supply will be short.

New England consumers report they are finding some suppliers of hot-rolled sheets are blanked out for two months in the first quarter. Other suppliers are reportedly out of the market completely.

Steel Bars . . .

Bar Prices, Page 142

Demand for carbon steel bars appears to be increasing in the Midwest. Chicago district consumers report they are finding it increasingly difficult to get supplies, with mill rolling cycles lengthening.

Tight supply conditions are pretty general, with demand pressure strong on automotive and farm equipment accounts.

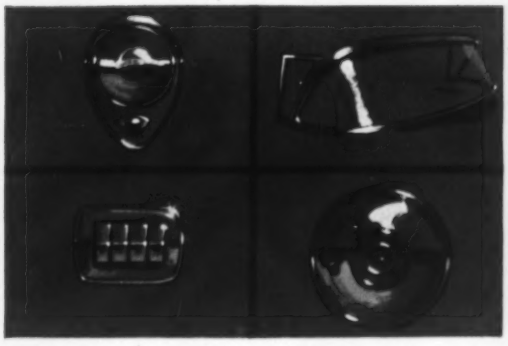
No noticeable loosening in supply conditions, or in demand, is seen in hot-rolled bars at Pittsburgh. Cold-finished bar producers are heavily booked. Indications are that they will have to blank out at least one month of production in the first quarter to care for year-end arrearages.

Automakers are furnishing most of the momentum behind demand, but other customers have re-entered the market for substantial tonnage in recent weeks. Reflecting the diversified consuming demand in the market, sales to builders of business machines are gaining.

Calumet Steel and Franklin Steel Divisions of Borg-Warner Corp. and Inland Steel Co have increased their prices on rail steel merchant bars to

modern design specifies stainless steel

McLouth
STAINLESS
Steel
for automobiles



The beautiful bright molding and trim that style your car are made of non-corrosive, easy to clean Stainless Steel. Designers of automobiles and hundreds of other products specify Stainless Steel for its many valuable properties.

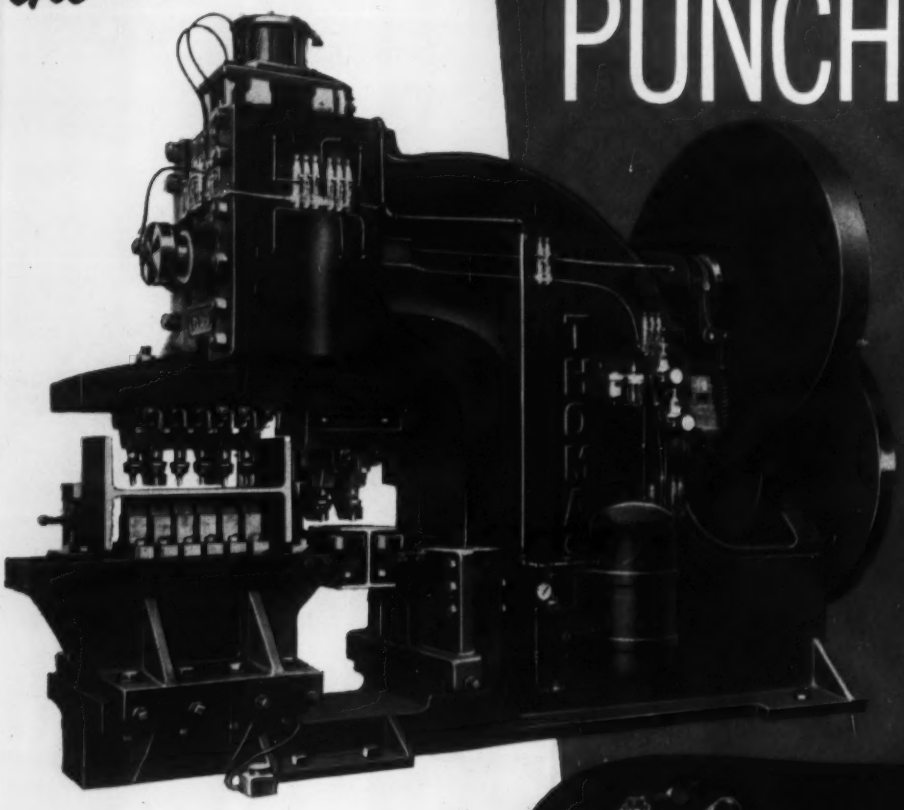
For the product you make today and the product you plan for tomorrow specify McLouth high quality sheet and strip Stainless Steel.

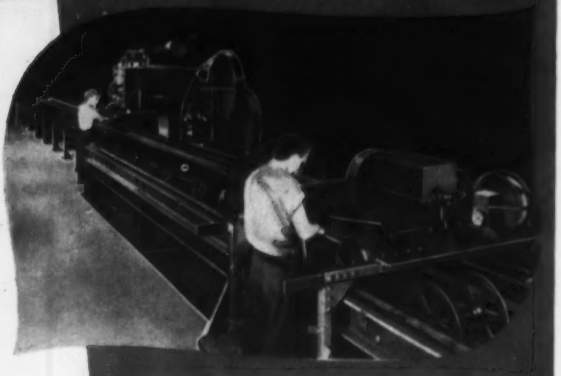
McLouth Steel Corporation
Detroit, Michigan

MANUFACTURERS OF STAINLESS AND CARBON STEELS

the trend is to THOMAS

for the most modern in BEAM PUNCHES





Modern design and quality construction...these are the factors required to lower your punching costs. You'll find these advantages in the Thomas line of new Beam Punches... in models of from 100 to 400 ton capacities.

Multiple tool setups for flanges and webs permit continuous operation through a wide range of sizes without money-consuming delays for tool changes. Quality construction throughout provides insurance against costly down time!

Write for details!

The Thomas Beam Punch-Motorized Spacing Table combination produces the ultimate in production efficiency for the medium tonnage shop. With the Spacing Table, accurate hole spacing is assured without layout, and material handling is reduced to the bare minimum.

THOMAS
MACHINE MANUFACTURING CO.
PITTSBURGH 23, PA.

Punches • Shears • Presses • Benders • Spacing Tables

40

$4.65 per 100 lb—the same level quoted on reinforcing bars and also equivalent to the price on billet—steel merchant and reinforcing bars.

Tubular Goods . . .

Tubular Goods Prices, Page 146

More production records are being broken as tube mills accelerate operations. National Supply Co.'s Spang Chalfant Division in Ambridge, Pa., established a new hot mill record in October.

Present tonnage on order books is more than can be produced and shipped in the remainder of this year, except in pipe used in house construction.

Outlook for all tubular products early next year: A continuation of present production rates.

Stainless Steel . . .

Stainless Steel Prices, Page 146

Stainless steel paneling, coated in whole or in part with bright-hued glazes, makes its architectural debut early next year, reports the American Iron & Steel Institute. The first panels will be used in a New York office for decorative purposes.

The new product was developed during research on panel wall structures sponsored at Princeton University by the institute's Committee of Stainless Steel Producers.

Because stainless steel is corrosion resistant, it is not necessary to coat the entire panel. Patterns may be sprayed on, showing bar steel intermittently, to lend sparkle to the color glaze. Some panels have rolled-on raised patterns. Glaze can be wiped from the high points. On flat surfaces, different colors can be spattered.

Plates . .

Plate Prices, Page 142

For the first time this year, manufacturers doing defense work are having difficulty getting enough plate tonnage. This is an indication of the severe shortage prevailing.

At Pittsburgh, construction firms and mill equipment builders, whose order backlogs are substantially above those of last year, report their steel allotments are based on their 1954 purchases. So they are operating at only 70 to 80 per cent of capacity. They could operate at 100 per cent had they enough steel.

The first quarter holds little prospect for much improvement in supply conditions. The chief producers are promising delivery of November orders in January. With the first month or two of the first quarter reserved for unfilled orders, new tonnage placements for delivery in the first three months of next year are limited.

A large tonnage of stainless plates for two Texas tower radio platforms to be built by Walsh-Portland, Me., will be fabricated by the Lukens Steel Co., Coatesville, Pa. Carbon plates and structurals will be supplied by the Bethlehem Steel Co., Bethlehem, Pa. A third tower, on which the Navy closed bids Nov. 1, will not be built at this time. Steel for these towers take a high allocation rating.

New England shops are meeting with increasing difficulty in placing orders for light gage plates under 5/16-in. This stringency in the lighter gages follows the usual pattern. When producers are swamped with heavy plate orders, they curtail bookings. Unless additional light gage tonnage is available from the sheet mills, supply gets critical, and there is little chance more sheet mill plates will be available soon.

With the ending of the navigation season on the Great Lakes early in December, substantial demand for plates and other steel products is expected for ship repairs. Throughout

Rubber Grows in New York!

In mid-town Manhattan's Rockefeller Center the new 19-story U.S. Rubber Company office building addition is rapidly nearing completion. Thousands of people daily gaze in wonderment at the progress of this new structure for which Ingalls fabricated the steel, again meeting the exacting schedules of today's construction.

U. S. RUBBER COMPANY
Building Addition
Rockefeller Center, Inc., Owner
George A. Fuller Company, Builder
Harrison & Abramovitz, Architect

STEEL fabricated by INGALLS

THE INGALLS IRON WORKS COMPANY
BIRMINGHAM, ALABAMA
Sales Offices: New York, Chicago, Pittsburgh, Houston, Atlanta, New Orleans
Plants: Birmingham, Ala.; Verona, Pa.; Pascagoula, Miss.; North Birmingham, Ala.; Decatur, Ala.

"STUD" NELSON
END-WELDS
"HANDLES"
IN A FLASH!

STUD AS TONG HOLD ON FORGING BILLET

EYE STUD

J STUD

THREADED STUDS AND WING NUTS SECURE TEMPORARY LIFTING BAIL

BENT STUD

Pull the trigger and it's all over. In a split second an eye stud is fused to the head of a hot water heater tank, and the NELWELD® method has solved another materials handling problem by end welding a handle.

There are endless uses for Nelson studs in transporting heavy or awkward materials along the assembly line. Also; some forge shops are welding straight studs to billets to save material, speed up handling and reduce costs.

Whatever your hanging, handling or holding problems, your Nelson Field Engineer is qualified to analyze your requirements. Let him demonstrate how to eliminate expensive and complicated materials handling operations with the NELWELD® method. Write for details, indicating your problem.

Stud Nelson

Fasten it Better at Less Cost with

NELWELD

NELSON STUD WELDING
2712 Toledo Avenue
Lorain, Ohio

Please send literature on how NELSON studs are used in materials handling.

NAME _____

COMPANY _____

ADDRESS _____

CITY AND STATE _____

NELSON STUD WELDING DIV. OF GREGORY INDUSTRIES, INC. LORAIN, OHIO

the winter the U. S. Steel Corp. fleet will undergo an extensive overhaul and repair program, according to Donald C. Potts, president of the Pittsburgh Steamship Division.

Semifinished Steel . . .

Semifinished Prices, Page 142

Tightening steel supply is spurring interest in conversion tonnage. Few mills, however, are in position to handle such business because their finishing capacity is too fully occupied. Chicago district producers report that consumers who frowned on the idea of buying conversion steel a month ago, are looking favorably in that direction. The inability to get semifinished steel for processing presents a serious drawback to conversion deals.

A new electric furnace was placed in production a week ago by Atlantic Steel Co., Atlanta. This top-charge furnace is the second such unit to be installed by the company within the last three years.

With rated capacity of 75 tons, it can produce more than 125,000 tons of steel annually, increasing the company's ingot capacity by 30 per cent. In addition to the two electric furnaces, Atlantic Steel operates three open hearths.

A new dust collection system has been installed in the electric furnace building to eliminate dust and smoke.

Structural Shapes . . .

Structural Shape Prices, Page 142

Extras on junior beams and junior channels were increased $6 to $20 a ton by Jones & Laughlin Steel Corp., effective Nov. 21. Prices depend on the size and weight of the shapes specified. Junior beams and channels are exclusively produced by J & L.

Base prices continue unchanged.

The increase reflects the tight supply condition prevailing in structurals generally. Construction firms report they can't work at more than 70 per cent of capacity because of shortages of channels, angles and wide flange beams.

Despite the advancing season, structural demand continues heavy. Inquiry is diversified and includes a number of sizable projects, including office buildings, bridges, power house installations, public buildings, schools, etc.

Some builders on private account are so eager to get position on shape fabricators' books they are trying to place round tonnages with detailed plans to come later. Other builders, confronted with far extended

delivery promises, are deferring action on pending projects.

Prices on fabricated material are definitely stronger than they have been at any time this year.

Not much, if any, improvement in supply conditions is likely in the first quarter. Mill deliveries are running two months behind schedule. This means a substantial portion of first quarter production will have to be devoted to caring for the overflow business from the fourth quarter. Some buyers are ordering more extensively from warehouse stocks.

Tin Plate . . .

Tin Plate Prices, Page 144

Tin plate mills are operating near capacity. Part of the activity is to build up stocks for the next seasonal increase in demand, which is expected to begin in late February or early March. Demand from sources other than canmakers continues to increase.

"European consumption is growing rapidly," according to Ernest T. Weir, chairman, National Steel Corp. Foreign demand is heavy for tin plate and secondaries as well.

Both shipments and production are above average for the fourth quarter. Pressure for quick delivery ceased in November. Producers now can fill demands on time.

Shipments of metal cans are running well ahead of last year's. This is indicated by figures announced by the Census Bureau for the first nine months. The total was 3,450,431 tons, against 3,224,651 in the corresponding period of last year. September shipments of 511,428 tons were off seasonally, from 565,220 in August, as revised, and were higher than the 457,983 tons in September, 1954.

Metal cans for fruit and vegetables (including juice) shipped during the first nine months totaled 1,168,644 tons, against 1,085,301 in the corresponding period of last year. Beer cans, second largest category, took 583,519 tons during the first nine months, compared with 515,499 tons in the same period of 1954.

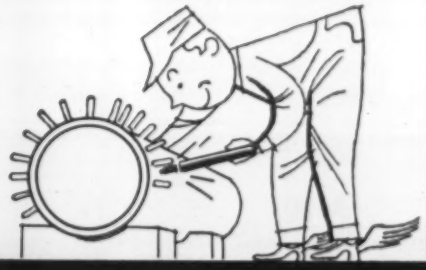
Warehouse . . .

Warehouse Prices, Page 147

Many warehouses are beginning to accumulate a large order backlog. As steel fabricators find first-quarter steel supply will probably be critically short, they are placing orders with distributors for delivery in January and February.

Distributors can sell all the flat-rolled products and structural steel

(Please turn to page 159)



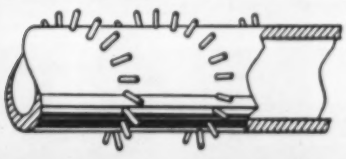
"STUD" NELSON

ATTACHES TEETH

IN A FLASH!

Threshers, harvesters, cornpickers and a wide variety of ginning and combing machinery get their teeth in short order with the NELWELD® System, the trigger-quick way to end-weld studs and other projections to steel. You reduce manufacturing costs, increase production and improve product quality. And with the NELWELD® System, the studs are there to stay!

END-WELDED NELSON STUDS ON COTTON GIN ROLL



If your product requires teeth, "dogs," or welded projections of any sort, call in a Nelson Field Engineer. He will be glad to study your product design and advise how the NELWELD® System can be used to your advantage. Mail the attached coupon for complete information.

Stud Nelson

Fasten it Better at Less Cost with

NELWELD®

NELSON STUD WELDING
2711 Toledo Avenue
Lorain, Ohio

Please send more information on how to cut costs, improve product design by the NELWELD method.

NAME _____

COMPANY _____

ADDRESS _____

CITY AND STATE _____

NELSON STUD WELDING DIV OF GREGORY INDUSTRIES, INC. LORAIN, OHIO

Current Ferroalloy Quotations

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Pa. 21-23% Mn, $90.50; 19-21% Mn, 1-3% Si, $88; 16-19% Mn, $86.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.) Base price per net ton $190, Clairton, Duquesne, Johnstown and Sheridan, Pa.; Alloy, W. Va.; Ashtabula, Marietta, Philo, O.; Sheffield, Ala.; Portland, Oreg., and Tacoma, Wash. Add or subtract $2.00 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%). Lump $198 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 76%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max, 0.07% C, 29.95c per lb of contained Mn, carload packed 30.7c, ton lots 31.8c, less ton 33c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.30% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk 21.85c per lb of contained Mn, packed, carload 22.9c, ton lot 24.5c, less ton 25.7c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max): Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lots 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carloads, 30c; 2000 lb to min carloads, 32c; 250 lb to 1999 lb 34c. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 11.2c per lb of alloy. Packed, c.l. 12.2c, ton 12.65c, less ton 13.65c, f.o.b. Alloy, W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lots 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lots $1.35, less ton $1.37 f.o.b. Niagara Falls, N.Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $177 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 26.25c per lb of contained Cr; c.l. packed 27.5c, ton lot 29.25c, less ton 30.65c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-71%). Contract, carload, lump, bulk, C 0.025% max (Simplex) 31.75c per lb contained Cr, 0.02 max 38.50c, 0.03 max 38c, 0.06 max 36.50c, 0.1 max 36c, 0.15 max 35.75c, 0.2 max 35.50c, 0.5 max 35.25c, 1.0 max 34c, 1.5 max 33.85c, 2.0 max 33.75c. Ton lot, add 3.1c, less ton add 4.8c. Carload packed add 1.45c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l. 8 M x D, bulk 27.4c per lb contained Cr. Packed c.l. 28.7c, ton 30.5c, less ton 32c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low-Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carloads, packed 8 M x D, 19.6c per lb of alloy, ton lot 20.85c; less ton lot, 22.05c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome-Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 39.05c per lb of contained Cr; 1" x down, bulk 39.8c. Delivered.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.2% min, Fe 0.2 max). Contract, carlot, packed 2" x D plate (about ⅛" thick) $1.25 per lb, ton lots $1.27, less ton lots $1.28. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.10 per lb of contained V. Delivered. Spot, add 10c. **Special Grade** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.20. **High Speed Grade** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.30.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 6, 68c; No. 79, 50c. freight allowed.

Vanadium Oxide: Contract, less carload lots, packed, $1.33 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed 21.40c; ton lot 22.50c f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contact, carload, lump, bulk, 11.75c per lb of contained Si. Packed, c.l. 13.85c, ton lot 15.3c, less ton 16.95c. F.o.b. Alloy, W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., and Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.2c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 14.5c per pound contained silicon. Packed, c.l. 16.2c, ton lots, 18c; less ton, 19.35c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 15.4c per lb of contained Si. Packed c.l. 17.05c, ton lot 18.7c, less ton 19.95c. Delivered. Spot, add, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 18.5c per lb of contained Si. Packed, c.l. 19.95c, ton lot 21.35c, less ton 22.4c. Delivered. Spot, add 0.25c.

Silicon Metal: (Min 98% Si, 0.75% max Fe, 0.07 max Ca). C.l. lump, bulk, 20.5c per lb of Si. Packed, c.l. 21.95c, ton lot 23.25c, less ton 24.25c. Add 0.5c for max 0.03 Ca grade. Deduct 0.5c for max 2% Fe grade analyzing min 96.5% Si. Spot, add 0.25c.

Alsifer: (Approx, 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy, ton lots packed 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 8.5c, per lb of alloy. Packed, c.l. 9.5c, ton lot 10.65c, less ton 11.5c. Delivered. Spot add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 26.25c per lb of alloy, ton lot 27.4c, less ton 28.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5%-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%). Contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 22c per lb of alloy, carload packed 23.05c, ton lot 24.95c, less ton 25.95c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 21.5c per lb of alloy, carload packed 22.95c, ton lot 25.25c, less ton 26.75c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3¾ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 16.95c per lb of briquet, carload packed in box pallets 17.15c, in bags 17.85c; 3000 lb to c.l. in box pallets 18.35c; 2000 lb to c.l. in bags, 19.05c; less than 2000 lb in bags 19.95c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 12.1c per lb of briquet, c.l. packed, pallets 12.3c, bags 13.1c; 3000 lb to c.l., pallets 13.5c; 2000 lb to c.l., bags, 14.3c, less ton 15.2c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 12.7c per lb of briquet, c.l. packed, pallets, 12.9c; bags 13.7c, 3000 lb to c.l., pallets, 14.1c; 2000 lb to c.l., bags, 14.9c; less ton 15.8c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—Weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.75c per lb of briquet; packed, pallets, 6.95c; bags, 7.75c; 3000 lb to c.l., pallets, 8.55c; 2000 lb to c.l. bags 9.35c; less ton 10.25c. Delivered. Spot, add 0.25c.

(Small size—Weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.9c. Packed, pallets 7.1c; bags 7.9c; 3000 lb to c.l. pallets 8.7c; 2000 to c.l. bags 9.5c; less ton 10.4c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $3.45 per lb of contained W; 2000 lb W to 5000 lb W, $3.55; less than 2000 lb W, $3.67. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $6.90 per lb of contained Cb. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb plus Ta 60% min C 0.30% max). Ton lots, 2" x D, $4.65 per lb of contained Cb plus Ta, delivered; less ton lots $4.70.

Silicaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carloads packed 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Contract, c.l. packed ½" x 12 M, 18.5c per lb of alloy, ton lots 19.65c, less ton 20.9c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 18.5c per lb of alloy, ton lots 19.65c; less ton lots 20.9c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

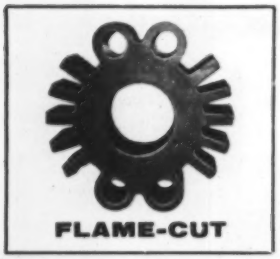
V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 17.2c per lb of alloy; ton lots 18.7c; less ton lots 19.95c, f.o.b. Niagara Falls; freight allowed to St. Louis.

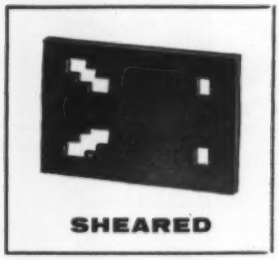
Siminal: (Approx. 20% each Si, Mn, Al; bal, Fe). Lump, carload, bulk 16.50c. Packed c.l. 17.50c, 2000 lb to c.l. 18.50c, less than 2000 lb 19c per lb of alloy. Delivered.

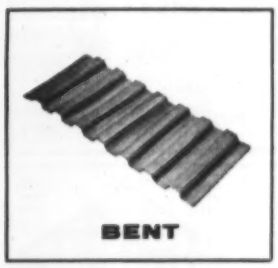
Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carloads, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, in 200-lb containers, f.o.b. Langeloth, Pa., $1.46 in all sizes except powdered which is $1.57; Washington, Pa., furnace, any quantity $1.46.

Technical Molybdic-Oxide: Per lb contained Mo, f.o.b. Langeloth, Pa., $1.25 in cans; in bags, $1.24, f.o.b. Langeloth, Pa.; $1.24, Washington, Pa.







LUKENS

How much is it costing you?

STEEL PLATE SHAPES SERVICE CAN HELP YOU CUT SCRAP, INVENTORY AND FREIGHT COSTS

If you're searching for ways to pare production costs, look at pre-formed parts. Savings of 5% to 25% are possible when you buy components already shaped from rolled carbon, alloy or clad steel plate.

With By-Products Steel Co.'s Steel Plate Shapes Service, you pay freight only on material you will use. Plate inventories can be reduced and scrap problems virtually eliminated, saving both dollars and space.

Equipment builders find consistent savings right down the line with pre-formed parts. A wide range of finishes, from as-formed to finish-machined, saves production steps. No costly patterns are needed; Steel Plate Shapes Service works directly from blueprints. Over 150 major machines are available to flame-cut, shear, bend, blank or press your parts.

Located next to the mills of the world's leading producer of specialty steel plate, we can work from plates up to 195" wide or 25" thick, form and heat treat them to your specifications. If you wish to find out how you can use this unique service to cut your production costs, write on your letterhead for Bulletin 712. Address: By-Products Steel Company, 742 Strode Avenue, Coatesville, Pennsylvania.

STEEL PLATE SHAPES SERVICE

BY-PRODUCTS STEEL CO.

A Division of Lukens Steel Company, Coatesville, Pennsylvania

Let FREEWAY "One-hit" production cut YOUR costs

on small, press-formed

STAMPINGS

Want stampings for less than you ever thought possible? If so . . . then let us explain how our high speed presses (that blank, form and trim in one operation) insure definite savings for you on large production runs! Just send us a print . . . you'll be pleasantly surprised with our quotation.

Freeway washers give you two BIG savings. First, they cost less . . . thanks to special processing. And second, they consistently "meet the specs" to minimize assembly time. Use coupon below.

Freeway semi-precision ball bearings give you positive anti-friction protection . . . for just pennies per bearing. Patented design cuts installation time up to 78%. Send for descriptive literature today.

Freeway WASHER & STAMPING COMPANY

P. O. Box 1756, Cleveland 5, Ohio

Gentlemen: Please send us more facts about . . . . .
( ) Stampings, ( ) Washers, ( ) Bearings.

Company.....

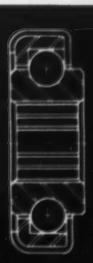
Street.....

City.....State.....

Signature.....

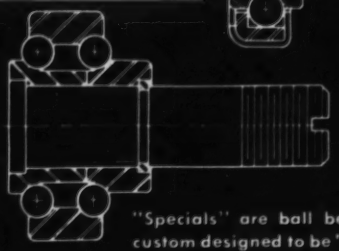
P

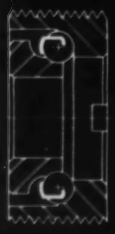
Specialists in Specials



No. 6788 GRAVITY ROLLER CONVEYOR BEARING

No. 6777 BEARING FOR WHEELS OF MONORAIL TRACK TROLLEYS





No. 6959 THREADED O. D. CADMIUM PLATED BEARING FOR RADIO TUNING DEVICE

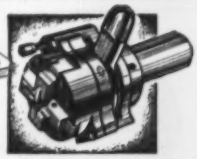
"Specials" are ball bearings custom designed to be "exactly right" for a particular application. As "specialists in specials", experienced NICE engineers take advantage of every design opportunity to reduce costs and to improve product performance and appearance. *NICE invites inquiries on YOUR special requirements.*

NICE

NICE BALL BEARING CO.

NICETOWN • PHILADELPHIA • PENNSYLVANIA

H&G Insert Chaser DIE HEADS



famous for accuracy and straightness of threads, low chaser costs, less downtime, more pieces per day.

THE EASTERN MACHINE SCREW CORP., 22-42 Barclay Street, New Haven, Conn.
Pacific Coast Representative: *A. C. Berbringer, Inc., 334 N. San Pedro St., Los Angeles, California.* Canada: *F. F. Barber Machinery Co., Toronto, Canada.*

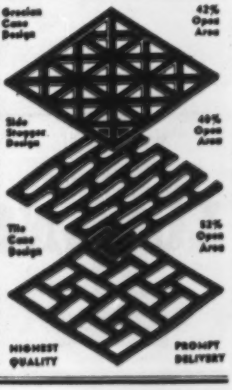
HOT DIP GALVANIZING

JOSEPH P. CATTIE & BROTHERS, INC.

2520 East Hagert Street

Phone: Re-9-8911 Philadelphia 25, Pa.

PERFORATED METALS FOR EVERY INDUSTRIAL USE



The "Ornamental" light-gauge designs here illustrated are only a few of the many you can choose from in our new Catalog 39 and we are always pleased to quote on original designs or special work of any kind.

For larger unit-openings, using metals up to ¼" in thickness, we offer a wide variety of equally attractive designs in our Catalog 36 on Diamond Architectural Grilles.

Send us your blueprints. We are equipped to fabricate special sections to any desired extent and welcome opportunities to make money-saving suggestions.

DIAMOND MANUFACTURING CO.
Box 32 WYOMING PENNA.
(Wilkes-Barre Area)

Sales Representatives in all principal cities. Consult Your Classified Telephone Directory.

HIGHEST QUALITY PROMPT DELIVERY

(*Concluded from page* 155)

they can get. Shortages are holding down sales. On such products as wire and tube, demand generally is not so heavy as at the mills.

Unbalanced stocks prevent warehousemen from accepting many mill-sized orders. First-quarter prospects for supplies are discouraging.

Carbuilders and railroads are inquiring for mill-size tonnages of steel from warehouses to no avail. Distributor stocks of major hot-rolled products are low and broken. Plates and structurals are in critical supply, while bars and sheets are scarce.

Distributors must depend heavily in the first quarter on receipt of delinquent shipments from mills. New tonnage placed for that period is restricted, especially for hot-rolled sheets. Some producers have blanked out two months on that product in an attempt to wipe out carry-overs.

In the New York metropolitan area, despite tightness in the product and uncertainty as to replacements, price cutting on galvanized sheets has developed.

Pig Iron . . .

Pig Iron Prices, Page 147

Blast furnaces produced a record 6,965,273 net tons of pig iron and ferroalloys during October, exceeding the former record, set during May this year, by more than 160,000 tons. The American Iron & Steel Institute, New York, also said production during the first ten months was at a new high of 64,147,625 tons, about 146,000 tons more than the output of the first ten months of 1953, the prior record period.

Furnace operators in nearly all districts are maintaining production at capacity. Shenango Furnace Co. lighted its No. 1 blast furnace at Sharpsville, Pa., after a 35-day shutdown for modernization and relining.

With foundry activity at a high pitch on the West Coast, melting rates there have advanced.

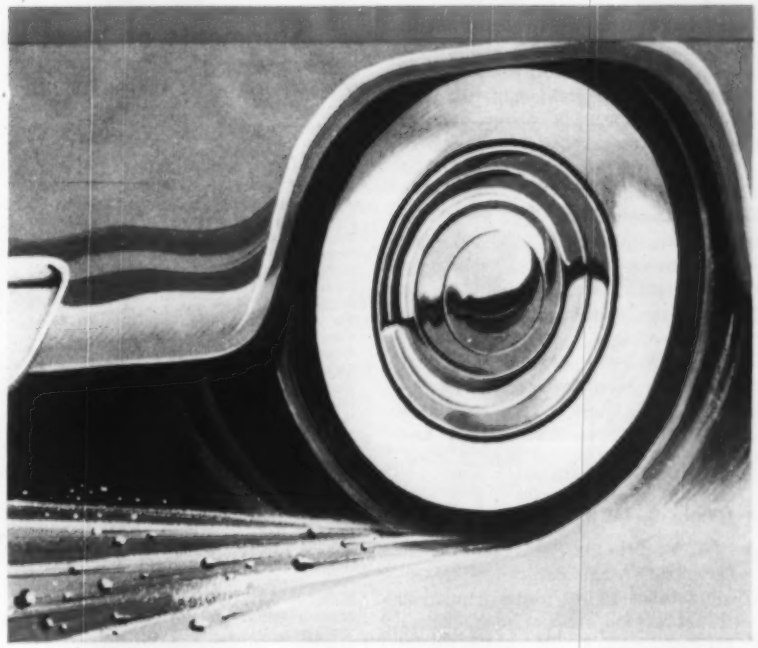
Iron Ore . . .

Iron Ore Prices, Page 164

Shipments of Lake Superior iron ore in the week ended Nov. 21 totaled 1,789,326 gross tons, reports the Lake Superior Iron Ore Association. In the preceding week, shipments amounted to 2,301,801 tons and in the like week last year, 538,159 tons.

Cumulative shipments for the 1955 navigation season to Nov. 21 were 85,869,058 tons. This compares with 60,328,272 tons moved up to Nov. 21 in the 1954 season.

Only 16 of the 260 vessels in the



when 150 200 250 300+ horsepower

paws the ground

forgings must bear the brunt of modern power!

• Modern cars, *powerful, responsive,* stress metal parts as never before.

For safety, for economy, critical parts should be forgings, fully trustworthy as to soundness and fatigue properties. Engines, transmissions, running gear serve more dependently when forged components are used.

Throughout industry manufacturers are learning that nothing is so indispensable as a forging — because a forging is trustworthy in service — because it has soundness that reduces costs for inspection, machining, rejections, and replacements. Send for the booklets, explaining these advantages and telling how you can have a Forging Engineer help you make economy studies revealing ways to improve your product or your process with forgings.

closed-die forgings for metal you can trust

DROP FORGING ASSOCIATION

605 Hanna Building • Cleveland 15

Symbolic emblem of the Drop Forging Association

Attach this advertisement signature to your letterhead and mail to Drop Forging Association to receive booklet "What is a Forging?" ☐ or "Management Guide to Use of Forgings". ☐ Check title or titles desired.

Great Lakes iron ore fleet are not in operation. Laying up for the winter will accelerate from here on, however.

Consumption of Lake Superior iron ore totaled 7,850,438 gross tons in October, bringing use for the first ten months of the year to 73,255,190 tons, according to Lake Superior Iron Ore Association. This compares with consumption of 7,538,666 tons in September, and 5,398,398 tons in October last year. Consumption in the first ten months of 1954 totaled 54,840,899 tons.

Stocks on lower lake docks and at furnaces on Nov. 1 amounted to 49,523,032 gross tons. This compares with 45,406,437 tons on Oct. 1 and with 51,868,432 tons on Nov. 1, 1954.

Rails, Cars . . .

Track Material Prices, Page 145

Domestic freight car orders in October totaled 12,843 units, compared with 3228 in September.

Freight car deliveries increased slightly from 3118 in September to 3722 in October.

Car orders as of Nov. 1 totaled 61,954, compared with 52,914 on Oct. 1 and 12,853 on Nov. 1, 1954.

Railroads, pressing for car steel, are receiving some political backing.

Shipments of Steel Products—September, 1955

(All Grades; Net Tons)

PRODUCTS	Carbon	Alloy	Stainless	Total Nine Months 1955	1954
Ingots	46,184	17,835	1,982	444,116	251,394
Blooms, slabs, etc.	170,054	50,825	2,279	2,076,483	1,086,312
Skelp	17,013	.....	.....	131,789	92,988
Wire rods	105,573	2,009	549	865,922	573,679
Structurals	421,535	4,140	21	3,431,869	3,478,766
Steel piling	33,134	53	.....	279,849	290,726
Plates	583,992	33,206	1,953	4,838,887	4,076,483
Rails—standard	89,224	.....	.....	918,578	981,709
Rails—other	5,380	.....	.....	56,505	66,943
Joint bars	5,435	.....	.....	53,621	57,420
Tie plates	24,011	.....	.....	240,815	211,298
Track spikes	7,310	.....	.....	72,674	56,542
Wheels	28,457	73	.....	220,981	148,785
Axles	11,165	25	.....	83,052	45,999
Bars—hot rolled	547,637	186,526	4,497	6,392,086	4,529,986
Bars—reinforcing	186,165	.....	.....	1,574,315	1,338,168
Bars—cold drawn	128,509	24,815	4,572	1,366,402	877,237
Tool steel	1,250	8,168	.....	83,042	62,934
Standard pipe	253,160	232	5	2,194,642	1,750,521
Oil country goods	184,082	38,173	.....	1,856,914	1,803,701
Line pipe	294,701	.....	.....	2,280,896	2,168,659
Mech. tubing	54,567	25,163	370	697,511	501,236
Pressure tubing	19,469	1,373	1,350	197,492	216,650
Wire—drawn	265,436	4,184	2,769	2,348,604	1,771,352
Nails & staples	58,321	.....	.....	523,234	442,784
Wire—barbed	5,161	.....	.....	101,974	114,663
Wire—fence	21,423	.....	1	269,100	255,190
Bale ties	3,687	.....	.....	53,662	45,742
Black plate	87,876	.....	.....	616,512	531,457
Tin plate—HD	116,295	.....	.....	915,775	1,100,684
Tin plate—electro.	471,624	.....	.....	3,750,257	3,082,817
Sheets—hot rolled	734,535	30,985	2,815	6,922,604	4,294,713
Sheets—cold rolled	1,222,236	6,260	12,980	10,981,152	6,733,656
Sheets—galvanized	269,020	.....	.....	2,087,155	1,752,383
Sheets—other coated	24,974	.....	.....	199,670	125,717
Sheets—enameling	20,974	.....	.....	162,085	126,478
Sheets—electrical	10,732	58,910	.....	584,513	433,933
Strip—hot rolled	168,118	3,047	524	1,546,656	1,052,058
Strip—cold rolled	123,585	1,373	22,605	1,251,209	918,410
Total shipments	6,821,600	497,375	59,272	62,672,603	47,450,173

This announcement appears as a matter of record only.

Union Tank Car Company

$25,000,000

3¾% Sinking Fund Debentures

due October 15, 1975

196,406 Shares

Common Stock

No par value

Private placement of the above securities has been arranged through the undersigned.

Smith, Barney & Co. Blunt Ellis & Simmons

November 10, 1955

Scrap . . .

Scrap Prices, Page 162

Philadelphia — Scrap prices generally are higher, reflecting good domestic demand and a substantial movement for export. Shipments this month from this port will be the heaviest in some time, totaling 31,000 tons.

No. 1 heavy melting, No. 1 bundles and No. 1 busheling have been advanced to $48, delivered. No. 2 heavy melting is higher at $43; and No. 2 bundles are $38. Several other steel grades are also up. So are the cast items.

Chicago—Several important grades of steelmaking scrap have advanced $1 a ton, climaxing the strong market tone prevailing for more than three weeks. Tonnage involved in the new purchases was sizable. Included were No. 1 industrial heavy melting at $47; No. 1 dealer heavy melting at $44; No. 1 factory bundles at $48; and No. 1 railroad heavy melting at $50. Blast furnace material is not sharing in the new market strength.

Pittsburgh — Stainless steel scrap continues its rapid price rise in 18-8 grades. Mill production of stainless is approaching 100 per cent of capacity, and stocks are dwindling. Prices paid for 18-8 bundles and solids are above $300 a ton and continue to rise. The trend is toward $350 a ton.

There's no trend in No. 1 heavy melting scrap. Strength in certain cast iron and railroad scrap grades resulted in price increases ranging from $1 to $3 a ton.

New York—Brokers' buying prices on No. 1 heavy melting and No. 1 bundles have been advanced to $42-$42.50. Prices are higher: On machine shop turnings at $21-$22; on mixed borings and turnings at $22-$23; and on short shovel turnings at $23-$24.Heavy breakable cast prices have been increased to $39-$40. Buying is brisk on both domestic and foreign account.

Cleveland — Although little new buying is reported, the scrap market tone continues strong. Mills are expected to re-enter the market actively around Dec. 1. Meanwhile, high steelmaking operations are cutting into mill inventories at a time of the year when collections and preparation activities usually are hampered by bad weather.

Detroit—Brokers anticipate higher prices to be bid on soon-to-close automotive lists. Increases are particularly expected in the No. 1 grades. No. 1 heavy melting is quoted at $40; machine shop turnings, $21.

Birmingham — Because steel mills with large scrap inventories seem determined to hold the price line, and dealers are determined not to sell at present levels, there is little activity in the open-hearth grades of scrap. Electric furnaces are operating at capacity. With stocks none too large, buying prices have increased on electric furnace grades. Some cast iron consumers have been trying to buy scrap above the going market, but have not had much success.

Los Angeles—For most scrap dealers, November was a shade slower than October. Despite this, fourth quarter volume will surpass that in the like period last year, when sales dwindled to almost nothing.

San Francisco—Steel scrap prices are holding firm on steady demand. Supplies are reported ample, but the rainy season is slowing deliveries.

Seattle—An outside buyer announced a drop of $4 in the prices on No. 1 and No. 2 heavy melting steel. Local dealers report previous levels ($44 and $40, respectively) are still being paid, and express doubt that any volume of scrap can be obtained at $4 under those prices.

(*Please turn to page* 164)

they all know the best place in Cleveland

"Hotel Cleveland, sir?"

Whether you arrive by train, plane or car, the friendliest place to stay is Hotel Cleveland, directly connected with Union Terminal.

No room charge for children under 14 when registered with an adult.

Hotel Cleveland

SONNABEND OPERATED HOTELS
Distinguished American Landmarks
CHICAGO: Edgewater Beach Hotel
BOSTON: Hotel Somerset
NEW YORK CITY: Ritz Tower Hotel
CLEVELAND: Hotel Cleveland

FOR SALE

By order of the U. S. District Court, Eastern District of Wisconsin, Milwaukee, Wisconsin

ALL OF THE OPERATING ASSETS OF THE BANKRUPT

NORTHEASTERN BOILER & WELDING, Ltd., GREEN BAY, WISCONSIN

STEEL FABRICATORS

consisting of approximately 71 acres of land, on state and federal highways, adjacent to C & N W R'y mainline with tracks running into main building; buildings, machinery and equipment, automobiles and trucks, furniture and fixtures, inventory and work in process and assignment of executory contracts and orders for the production of goods, and furnishing labor and materials.

AN UNUSUAL OPPORTUNITY FOR A LARGE COMPANY TO DISPERSE ITS OPERATIONS OR FOR A SMALLER MANUFACTURER OF HEAVY MACHINERY OR FABRICATING TO TAKE OVER A GOING CONCERN WHICH HAS NOT BEEN CLOSED FOR A SINGLE DAY AND HAS OPERATED WITH SUBSTANTIAL NET PROFIT UNDER THE TRUSTEE.

For more detailed information and inventory, and terms of sale and bidding, write Mr. Frank Cartier, Trustee, Northeastern Boiler & Welding, Ltd., Green Bay, Wisconsin.

U. S. DISTRICT COURT FOR EASTERN DISTRICT OF WISCONSIN, MILWAUKEE, WILL RECEIVE BIDS THEREFOR ON DECEMBER 5, 1955, AT 2 O'CLOCK P.M., IN OPEN COMPETITIVE BIDDING.

Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Nov. 23	$46.33
Nov. 16	45.67
Oct. Avg.	45.17
Nov. 1954	33.33
Nov. 1950	41.33

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

(Delivered consumer's plant)

No. 1 heavy melting	45.00-46.00
No. 2 heavy melting	40.00-41.00
No. 1 bundles	45.00-46.00
No. 2 bundles	36.00-37.00
No. 1 busheling	45.00-46.00
Machine shop turnings	*30.00-31.00*
Mixed borings, turnings	*30.00-31.00*
Short shovel turnings	33.00-34.00
Cast iron borings	33.00-34.00
Cut structurals, 3 ft lengths	49.00-50.00
Heavy turnings	42.00-43.00
Punchings & plate scrap	49.00-50.00
Electric furnace bundles	48.00-49.00

Cast Iron Grades

No. 1 cupola	42.00-43.00
Charging box cast	*42.00-43.00*
Heavy breakable cast	*42.00-43.00*
Unstripped motor blocks	*30.00-31.00*
No. 1 machinery cast	*51.00-52.00*

Railroad Scrap

No. 1 R.R. heavy melt.	49.00-50.00
Rails, 2 ft and under	*60.00-61.00*
Rails, 18 in. and under	*61.00-62.00*
Rails, random lengths	56.00-57.00
Railroad specialties	54.00-55.00

Stainless Steel Scrap

18-8 bundles & solids	*310.00-320.00*
18-8 turnings	*180.00-190.00*
430 bundles & solids	100.00-110.00
430 turnings	60.00-65.00

CLEVELAND

(Delivered consumer's plant)

No. 1 heavy melting	45.00-46.00
No. 2 heavy melting	40.00-41.00
No. 1 bundles	45.00-46.00
No. 2 bundles	35.00-36.00
No. 1 busheling	45.00-46.00
Machine shop turnings	23.00-24.00
Mixed borings, turnings	27.50-28.50
Short shovel turnings	27.50-28.50
Cast iron borings	27.50-28.50
Low phos.	45.00-46.00
Cut structural plates 2 ft and under	*51.00-52.00*
Alloy free, short shovel turnings	31.00-32.00
Electric furnace bundles	45.50-46.50

Cast Iron Grades

No. 1 cupola	*48.00-49.00*
Charging box cast	40.00-41.00
Stove plate	46.00-47.00
Heavy breakable cast	37.00-38.00
Unstripped motor blocks	29.00-30.00
Brake shoes	35.00-36.00
Clean auto cast	48.00-49.00
Burnt cast	37.00-38.00
Drop broken machinery	*50.00-51.00*

Railroad Scrap

No. 1 R.R. heavy melt.	45.00-46.00
R.R. malleable	53.00-54.00
Rails, 2 ft and under	62.00-63.00
Rails, 18 in. and under	63.00-64.00
Rails, random lengths	58.00-59.00
Cast steel	48.00-49.00
Railroad specialties	54.00-55.00
Uncut tires	49.00-50.00
Angles, splice bars	54.50-55.50
Rails, rerolling	63.00-64.00

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	290.00-300.00
18-8 turnings	130.00-140.00
430 clips, bundles, solids	90.00-100.00
430 turnings	40.00-50.00

YOUNGSTOWN

(Delivered consumer's plant)

No. 1 heavy melting	47.50-48.50
No. 2 heavy melting	35.00-36.00
No. 1 bundles	47.50-48.50
No. 2 bundles	32.00-33.00
No. 1 busheling	47.50-48.50
Machine shop turnings	24.00-25.00
Short shovel turnings	29.00-30.00
Cast iron borings	29.00-30.00
Low phos.	47.50-48.50
Electric furnace bundles	47.50-48.50

Railroad Scrap

No. 1 R.R. heavy melt.	48.00-49.00

CHICAGO

No. 1 heavy melting	*44.00-47.00*
No. 2 heavy melting	*35.00-36.00*
No. 1 factory bundles	*47.00-48.00*
No. 1 dealer bundles	43.00-44.00
No. 2 bundles	33.00-34.00
No. 1 busheling	*44.00-47.00*
Machine shop turnings	27.00-28.00
Mixed borings, turnings	29.00-30.00
Short shovel turnings	29.00-30.00
Cast iron borings	29.00-30.00
Cut structurals, 3 ft	*48.00-49.00*
Punchings & plate scrap	*49.00-50.00*

Cast Iron Grades

No. 1 cupola	*48.00-49.00*
Stove plate	*39.00-40.00*
Unstripped motor blocks	*35.00-36.00*
Clean auto cast	*51.00-52.00*
Drop broken machinery	*51.00-52.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*49.00-50.00*
R.R. malleable	*57.00-58.00*
Rails, 2 ft and under	60.00-61.00
Rails, 18 in. and under	61.00-62.00
Angles, splice bars	57.00-58.00
Rails, rerolling	66.00-67.00

Stainless Steel Scrap

18-8 bundles & solids	320.00-335.00
18-8 turnings	225.00-235.00
430 bundles & solids	100.00-105.00
430 turnings	45.00-50.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*40.00*
No. 2 heavy melting	30.00
No. 1 bundles	*40.00*
No. 2 bundles	28.00
No. 1 busheling	*40.00*
Machine shop turnings	*21.00*
Mixed borings, turnings	22.00
Short shovel turnings	24.00
Punchings & plate scrap	48.00

Cast Iron Grades

No. 1 cupola	40.00
Charging box cast	33.00
Stove plate	32.00
Heavy breakable	32.00
Unstripped motor blocks	22.00
Clean auto cast	44.00
Malleable	35.00

BIRMINGHAM

No. 1 heavy melting	*40.00-41.00*
No. 2 heavy melting	35.00-36.00
No. 1 bundles	38.00-39.00
No. 2 bundles	28.00-29.00
No. 1 busheling	38.00-39.00
Cast iron borings	17.00-18.00
Short shovel turnings	28.00-29.00
Machine shop turnings	27.00-28.00
Electric furnace bundles	*46.00-47.00*

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	47.50-48.00
Stove plate	44.50-45.50
Bar crops and plate	*49.00-50.00*
Structural plate, 2 ft	*48.00-49.00*
Unstripped motor blocks	36.00-37.00
Charging box cast	30.00-31.00
No. 1 wheels	38.00-39.00

Railroad Scrap

No. 1 R.R. heavy melt.	*46.00-47.00*
Rails, 18-in. and under	*59.00-60.00*
Rails, rerolling	*60.00-61.00*
Rails, random lengths	53.00-54.00
Angles, splice bars	55.00-56.00

PHILADELPHIA

(Delivered consumer's plant)

No. 1 heavy melting	*48.00*
No. 2 heavy melting	*43.00*
No. 1 bundles	*48.00*
No. 2 bundles	*38.00*
No. 1 busheling	*48.00*
Electric furnace bundles	*49.00†*
Machine shop turnings	*30.50-31.00*
Mixed borings, turnings	*30.50-31.00*
Short shovel turnings	*33.00*
Structurals & plate	*50.00-51.00*
Heavy turnings	*43.00-44.00*
Couplers, springs, wheels	53.00
Rail crops, 2 ft & under	59.00-60.00

Cast Iron Grades

No. 1 cupola	*44.00-47.00*
Malleable	*61.00*
Heavy breakable cast	*47.00*
Drop broken machinery	*52.00-53.00*

†Nominal.

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*42.00-42.50*
No. 2 heavy melting	37.00-38.00
No. 1 bundles	*42.00-42.50*
No. 2 bundles	32.00-33.00
Machine shop turnings	*21.00-22.00*
Mixed borings, turnings	*22.00-23.00*
Short shovel turnings	*23.00-24.00*
Low phos. (structural & plate)	42.50-43.50

Cast Iron Grades

No. 1 cupola	37.00-38.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	*39.00-40.00*

Stainless Steel

18-8 sheets, clips, solids	290.00-300.00
18-8 borings, turnings	150.00-160.00
430 sheets, clips, solids	120.00-125.00
410 sheets, clips, solids	100.00-105.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	37.50-40.00
No. 2 heavy melting	33.00-35.50
No. 1 bundles	37.50-39.00
No. 2 bundles	28.00-28.50
Machine shop turnings	21.00-21.50
Mixed borings, turnings	23.00-23.50
Short shovel turnings	24.00-24.50
No. 1 cast	36.00-36.50
Mixed cupola cast	34.00-34.50
No. 1 machinery cast	39.00-39.50

BUFFALO

No. 1 heavy melting	43.00-44.00
No. 2 heavy melting	37.00-38.00
No. 1 bundles	43.00-44.00
No. 2 bundles	32.00-33.00
No. 1 busheling	43.00-44.00
Mixed borings, turnings	29.00-30.00
Machine shop turnings	27.00-28.00
Short shovel turnings	30.00-31.00
Cast iron borings	30.00-31.00
Low phos.	47.00-48.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	40.00-41.00
No. 1 machinery	43.00-44.00

Railroad Scrap

Rails, random lengths	47.00-48.00
Rails, 2 ft and under	51.00-52.00
Railroad specialties	48.00-49.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	41.00-42.00
No. 2 heavy melting	35.00-36.00
No. 1 bundles	41.00-42.00
No. 2 bundles	32.00-33.00
No. 1 busheling	41.00-42.00
Machine shop turnings	25.50-26.50
Mixed borings turnings	24.75-25.75
Short shovel turnings	28.00-29.00
Cast iron borings	24.75-25.75
Low phos., 18 in.	50.00-51.00

Cast Iron Grades

No. 1 cupola	43.50-44.50
Heavy breakable cast	41.00-42.00
Charging box cast	41.00-42.00
Drop broken machinery	49.00-50.00

Railroad Scrap

No. 1 R.R. heavy melt.	44.00-45.00
Rails, 18 in. and under	60.00-61.00
Rails, random lengths	53.00-54.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	38.50
No. 2 heavy melting	36.00
No. 1 bundles	39.50
No. 2 bundles	31.50
Machine shop turnings	28.00
Short shovel turnings	28.00

Cast Iron Grades

No. 1 cupola	46.50
Charging box cast	39.00
Heavy breakable cast	37.00
Unstripped motor blocks	37.00
Brake shoes	38.00
Clean auto cast	47.00
Stove plate	40.00

Railroad Scrap

No. 1 R.R. heavy melt.	48.00
Rails, 18 in. and under	60.00
Rails, random lengths	56.00
Rails, rerolling	64.00
Angles, splice bars	55.00

SEATTLE

(Delivered consumer's plant)

No. 1 heavy melting	44.00
No. 2 heavy melting	40.00
No. 1 bundles	39.50
No. 2 bundles	34.00
No. 3 bundles	19.00
Machine shop turnings	15.00-16.00
Mixed borings, turnings	15.00-16.00
Short shovel turnings	15.00-16.00
Electric furnace, No. 1	50.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	43.00
Heavy breakable cast	38.00
No. 1 wheels	35.00
Unstripped motor blocks	29.00
Clean motor blocks	40.00
Stove plate (f.o.b. plant)	30.00
Brake shoes	35.00

Railroad Scrap (Delivered consumer's plant)

Rails, random lengths	33.00

LOS ANGELES

No. 1 heavy melting	39.00
No. 2 heavy melting	37.00
No. 1 bundles	39.00
No. 2 bundles	35.00
Machine shop turnings	12.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	43.00-45.00

SAN FRANCISCO

No. 1 heavy melting	39.00
No. 2 heavy melting	37.00
No. 1 bundles	39.00
No. 2 bundles	33.00
No. 1 busheling	39.00
Machine shop turnings	18.00
Mixed borings, turnings	18.00
Short shovel turnings	20.00
Cast iron borings	18.00
Cut structurals	41.00
Heavy turnings	20.00
Punchings & plate scrap	39.00

Cast Iron Grades

No. 1 cupola	47.00-48.00
Charging box cast	35.00
Stove plate	39.00
Heavy breakable cast	36.00
Unstripped motor blocks	32.00
Brake shoes	35.00
Clean auto cast	45.00
No. 1 wheels	39.00
Burnt cast	23.00
Drop broken machinery	48.00

HAMILTON, ONT.

(Delivered prices)

No. 1 heavy melting	38.50
No. 2 heavy melting	35.50
No. 1 bundles	38.50
No. 2 bundles	32.50
Mixed steel scrap	32.50
Mixed borings, turnings	17.00
Rails, remelting	47.50
Busheling, new factory: Prepared	36.50
Unprepared	32.50
Short steel turnings	21.00

Cast Iron Grades†

No. 1 machinery cast	42.00-45.00

†F.o.b., shipping point.

GREAT MOMENTS IN THE HISTORY OF IRON AND STEEL MAKING

Robert L. Stevens

The first use of the T-Rail invented by Robert L. Stevens.
This is the eleventh in a series of outstanding inventions and developments that have contributed to the progress of the iron and steel industry.

1830
The T-Rail

It was a grateful iron and steel industry that greeted the T-Rail design of Robert L. Stevens in 1830, although it wasn't until 1845 that they were first rolled in America.

Transportation was developing at a rapid rate and rails up to that point were unsatisfactory. The roads required a rail that could meet increased loads, speeds and travel. Flat rails jarred loose. Cast iron and rolled shaped sections proved inadequate. So, too, were the first rolled rails. Stevens' rail had a broad base which fastened directly onto the cross ties. It did the job and served the American rail system during its most climactic period.

With the advent of the Bessemer process and later the open-hearth process, production expanded and quality improved. But by 1883 iron had given way almost entirely to steel. From 1911 all rails have been steel. Today, the buyer of rails receives a product that has been tested and inspected more exhaustively than any other heavy product in the steel industry.

These special steels require special scrap of known analysis, a problem particularly suited to our experience, personnel, equipment, and the strategic location of our offices. Possibly our facilities may help you solve a problem in iron or steel scrap.

CONSULT OUR NEAREST OFFICE FOR THE PURCHASE AND SALE OF SCRAP

LURIA BROTHERS AND COMPANY, INC.

MAIN OFFICE
LINCOLN-LIBERTY BLDG.
Philadelphia 7, Penna.

PLANTS
LEBANON, PENNA. DETROIT (ECORSE), MICHIGAN
READING, PENNA. PITTSBURGH, PENNA.
MODENA, PENNA. ERIE, PENNA.

OFFICES

BIRMINGHAM, ALA.	HOUSTON, TEXAS	PUEBLO, COLORADO
BOSTON, MASS.	LEBANON, PENNA.	READING, PENNA.
BUFFALO, N. Y.	LOS ANGELES, CAL.	ST. LOUIS, MO.
CHICAGO, ILLINOIS	NEW YORK, N. Y.	SAN FRANCISCO, CAL.
CLEVELAND, OHIO	PITTSBURGH, PA.	SEATTLE, WASH.
DETROIT, MICH.		MONTREAL, CANADA

EXPORTS-IMPORTS **LIVINGSTON & SOUTHARD, INC.** 99 Park Ave., New York, N. Y. *Cable Address:* FORENTRACO

LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Ores

Lake Superior Iron Ore

(Prices effective for the 1955 shipping season, gross ton, 51.50% iron natural, rail of vessel, lower lake ports)

Old range bessemer	$10.40
Old range nonbessemer	10.25
Mesabi bessemer	10.25
Mesabi nonbessemer	10.10
Open-hearth lump	11.25
High phosphorus	10.00

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

Foundry and basic 52-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60-68%	20.00
N. African hematite (spot)...nom.	18.00-20.00
Brazilian iron ore, 68-69% (spot)	24.00-26.00

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	$30.00-$31.00
Domestic, scheelite, mine	63.00

Manganese Ore

Mn 48%, nearby, 95c-$1.05 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; 46-47%, 75c-80c.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and African

48% 2.8:1 nom.	$45.00-$50.00
48% 3:1	42.00-44.00
48% no ratio	34.00

South African Transvaal

44% no ratio	$19.00-$20.00
48% no ratio	32.00

Domestic

Rail nearest seller

18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked	$1.00

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

55-60%	$3.60-$3.85
60-65%	3.85-4.00

Vanadium Ore

Cents per lb V_2O_5 content, deld. mills

Domestic	31.00

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $122; Salina, Pa., $127; Niles, O., $133.

Super-Duty: St. Louis, $150.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., Hawston, Pa., $128; Warren, Niles, O., Hays, Pa., $133; Morrisville, Pa., $131.50; E. Chicago, Ind., Joliet, Rockdale, Ill., $138; Lehigh, Utah, $144; Los Angeles, $151.

Super Duty: Hays, Sproul, Hawston, Pa., Warren, Windham, O., Athens, Tex., $145; Morrisville, Pa., Niles, O., $148; Joliet, Ill., $151; Curtner, Calif., $163.

Semisilica Brick (per 1000)

Clearfield, Pa., $139; Philadelphia, $124; Woodbridge, N. J., $122.

Insulating Fire Brick (per 1000)

2300° *F:* Massillon, O., $178.50; Clearfield, Pa., $213; Augusta, Ga., Beaver Falls, Zelienople, Pa., Mexico, Mo., $206; Vandalia, Mo., $214.10; Portsmouth, O., $207.50; Bessemer, Ala., $212.80.

Ladle Brick (per 1000)

Dry Pressed: Aisey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Mexico, Mo., $88.50; Wellsville, O., $92.50; Clearfield, Pa., Portsmouth, O. $98.

High-Alumina Brick (per 1000)

50 *Per Cent:* Clearfield, Pa., St. Louis, Mexico, Mo., $194; Danville, Ill., $197; Philadelphia, $201.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Clearfield, Pa., $241; Danville, Ill., $244; Philadelphia, $248.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $279; Danville, Ill., $281; Clearfield, Pa., Philadelphia, $286.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $157; Clearfield, Pa., $158.50; St. Louis, $169.30.

Nozzles (per 1000)

Reesdale, Pa., $253.70; Johnstown, Pa. $259.20; Clearfield, Pa., $259.40; St. Louis, $259.45; Bridgeburg, Pa., $286.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $196; Clearfield, Pa., $198; St. Louis, $195.80.

Dolomite (per net ton)

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Narlo, O., $15; Thornton, McCook, Ill., $15.60; Dolly Siding, Bonne Terre, Mo., $14.

Magnesite (per net ton)

Domestic, dead-burned, bulk, ½-in. grains with fines: Chewelah, Wash., $40; Luning, Nev., $40. ⅝-in. grains with fines: Baltimore, $66.40.

Metallurgical Coke

Price per net ton
Beehive Ovens

Connellsville, furnace	$13.25-$14.00
Connellsville, foundry	16.00-17.00

Oven Foundry Coke

Kearny, N. J., ovens	$25.50
Camden, N. J., ovens	25.00
Everett, Mass., ovens New England, deld.	*27.05
Chicago, ovens	25.75
Chicago, deld.	27.25
Terre Haute, Ind., ovens	25.50
Milwaukee, ovens	26.25
Indianapolis, ovens	25.50
Portsmouth, O., ovens	24.75
Cincinnati, deld.	27.34
Painesville, O., ovens	26.25
Cleveland, deld.	28.18
Birmingham, ovens	24.40
Cincinnati, deld.	29.33
Buffalo, ovens	25.75
Buffalo, deld.	27.00
Lone Star, Tex., ovens	19.50
Neville Island, Pa., ovens	25.00
Philadelphia, ovens	25.00
Swedeland, Pa., ovens	25.00
St. Paul, ovens	25.00
Detroit, ovens	26.25
Detroit, deld.	27.25
Pontiac, deld.	27.81
Saginaw, deld.	29.33

*Or within $4.55 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	32.00-34.00
Industrial xylene	32.00-35.00

Per ton, bulk, ovens

Ammonium sulphate	$42-$45
Birmingham area	42.00†

†With port equalization against imports.

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $38-$39; 70%, $35-$36; 60%, $31-$32. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $34; Mexican, $25.50.

Electrodes

Threaded with nipple, unboxed, f.o.b. plant

GRAPHITE

Diam (Inches)	Length (Inches)	Per 100 lb
2	24	$52.50
2½	30	33.75
3	40	32.00
4	40	30.25
5½	40	30.00
6	60	27.25
7	60	26.75
8, 9, 10	60	24.25
12	72	27.25
14	60	23.50
16	72	22.50
17	60	23.00
18	72	22.50
20	72	22.25

CARBON

8	60	12.10
10	60	11.80
12	60	11.75
14	60	11.70
14	72	10.85
17	60	10.75
17	72	10.35
20	84	10.30
20	90	10.10
24	72, 84	10.30
24	96	10.05
30	84	10.20
40, 35	110	9.90
40	100	9.90

(*Concluded from page* 161)

Receipts continue good, but weather will slow down shipments from here on.

Exporters continue to pay high prices for full cargo trans-Pacific charters. From North Pacific, Hawaii and North Atlantic, several vessels have been taken for Japanese discharge. From North Atlantic, $211,000 to $220,000 has been paid for full cargoes. From the Everglades to Japan, a deal was closed at $22.60 a long ton. From Hawaii to two Japanese ports another charter was closed at $165,000, free load and discharge.

At these freights, including high purchase levels, the delivered price in Japan is thought above $60 a ton.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

4000 tons, plant addition, General Electric Co., Louisville, to the Ingalls Iron Works, Birmingham.

2000 tons, Reading Railroad bridge, Reading, Pa., to Phoenix Bridge Co., Phoenixville, Pa.

1300 tons, section of New Jersey approach to the Lincoln tunnel, New York metropolitan area, to American Bridge Division, U. S. Steel Corp., Pittsburgh.

515 tons, Pennsylvania Railroad bridge, Conway, Pa., to American Bridge Division, U. S. Steel Corp, Pittsburgh.

360 tons, addition to fabricating plant to Isaacson Iron Works, Seattle.

350 tons, Long Island Railroad bridge, Long Island, N. Y., through Horn Construction Co., to American Bridge Division, U. S. Steel Corp., Pittsburgh.

155 tons, high school, Andover, Mass., to Groisser & Shlager Iron Works, Somerville, Mass.; Rugo Bros. Construction Co., Boston, general contractor.

150 tons, medical building, Chattanooga, Tenn., to Lloyd E. Jones Co., Chattanooga; J. A. Jones Construction Co., Atlanta, general contractor.

150 tons, plant addition, John Nesbitt Inc., Philadelphia, to Belmont Iron Works, Eddystone, Pa.

125 tons, 12 floodlight towers, Pennsylvania Railroad, to American Bridge Division, U. S. Steel Corp., Pittsburgh.

STRUCTURAL STEEL PENDING

12,000 tons, Tishman office building, Park avenue, New York, bids asked.

8000 tons, courthouse, Queens, New York, bids Nov. 30.

3000 tons, office building, 40th St. and Sixth Ave., New York, George A. Fuller Co., that city, engineer in charge.

3000 tons, power plant work, West Penn Power Co., Pittsburgh, bids asked by Sanderson & Porter, engineer, New York.

2425 tons, 14 grade separation structures, Connecticut turnpike, Westport-Fairfield, Conn., projects 308-01 and 308-02; L. G. DeFalice & Son, Inc., North Haven, Conn., low, general contract; also 1255 tons, reinforcing bars, and 575 tons, bearing piles.

1700 tons, state thruway work, Erie county, New York, bids Dec. 1.

1500 tons, rehabilitation center, General State Authority, Upper Yodder township, Cambria county, Pa.; bids Dec. 14.

1300 tons, seven overpassing structures, Connecticut turnpike, Stratford-Milford, Conn., project 1313-03; D. V. Frione & Co. Inc., New Haven, low, general contract; also 865 tons, reinforcing bars, and 665 tons, steel piles.

1200 tons, state grade crossing elimination, Nassau county, New York, bids Dec. 1; this is the third time this project has been up for figuring.

500 tons, transmission towers, Bonneville Power Administration postponed to Nov. 21 from Nov. 16; Portland, Oreg.

MANAGER - ASSISTANT

STEEL FABRICATING PLANT. MUST BE TECHNICALLY QUALIFIED IN MOST MODERN TECHNIQUES OF DIFFICULT MEDIUM PLATE-FORMING AND WELDING, ESTIMATING AND SALES. VIGOROUS, WELL-QUALIFIED MAN WILL HAVE EXCELLENT OPPORTUNITY IN NORTHERN PHILADELPHIA METROPOLITAN AREA.

REPLY BOX 346, STEEL
PENTON BUILDING CLEVELAND 13, OHIO

CLASSIFIED

Help Wanted

METALLURGIST

Steel Foundry in East desires services of graduate metallurgist with some experience in acid and basic melting procedures and sand control. Please give full particulars regarding background and salary desired in first letter. Reply Box 334, STEEL Penton Bldg., Cleveland 13, Ohio.

Midwestern corporations have opening for REGISTERED PATENT ATTORNEY. Requirements: Engineering and law graduate with several years' experience in patent prosecution. Excellent opportunity and future for competent person. Reply Box 345, STEEL, Penton Bldg., Cleveland 13, Ohio.

EXCELLENT OPPORTUNITY

For young man willing to assume responsibility. Should be familiar with production problems and have experience in handling men. Experience in tube production and cold drawing preferred. Give full particulars—qualifications, experience and present salary. Reply Box 348, STEEL, Penton Building, Cleveland 13, Ohio.

We desire to set up our production of small steel castings on a piece-work basis instead of hourly rates. We need the services of someone who is thoroughly familiar with such an operation, capable of installing this system in our foundry. Salary open. All replies confidential. Address: P. O. Box 13294, Houston, Texas.

Positions Wanted

ERECTION SUPERINTENDENT

Six years' experience estimating, supervising erection of mill buildings, schools, bridges and apartment houses using cranes or derricks. Will relocate. Reply Box 343, STEEL, Penton Bldg., Cleveland 13, Ohio.

STEEL MILL SALESMAN wants additional connection on commission for Philadelphia and New York City territory. Reply 347, STEEL, Penton Bldg., Cleveland 13, Ohio.

UNDISPLAYED CLASSIFIED RATES

ALL CLASSIFICATIONS

Other than "Positions Wanted"

	Set Solid	All Capitals	All Caps Leaded
50 words or less	$15.00	$19.30	$23.40
Each additional word	.30	.38	.47

POSITIONS WANTED

25 words or less	$ 3.60	$ 4.50	$ 5.40
Each additional word	.14	.18	.22

Cash with order necessary on "Positions Wanted"

Keyed address takes seven words. Replies forwarded without charge.

All classified pages are 3 columns, each column 2¼".

Forms close 10 days prior to publication date.

STEEL *The Weekly Magazine of Metalworking*

Penton Building, Cleveland 13, Ohio

WANTED

PRODUCTION SUPERVISOR

Exceptional opportunity for permanent position responsible DIRECTLY TO THE PRESIDENT for man under 40 with good education and experience in mass production especially of medium sized forgings, hardening and finishing, and to set up and operate production control and cost in modern progressing plant with friendly atmosphere. Apply in confidence with full information to:

Ernest Estwing

ESTWING MANUFACTURING CO.
Rockford, Illinois

GANTRY 'A' Frame Type Mounted on Wheels

Electrified (AC, 220 Volts)
5-10 Ton Capacity, 40-60 Ft. Span
Approximately 20 ft. Lift

Reply Box 344, STEEL
Penton Building Cleveland 13, Ohio

FOR SALE

One (1) Used G.E., Type M, Wound Rotor, 500 H.P. Motor, 450 RPM, 2300 volt, 3 phase, 60 cycle, Open; also four (4) Used 50 H.P. Westinghouse Induction Motors, with manual starters, 440 volt, 3 phase, 60 cycle, Type CS, two (2) having 870 RPM Style 271825, two (2) having 1160 RPM Style 330532.

UNIVERSAL CYCLOPS STEEL CORPORATION
Phone P. L. GEDEON 7-2221
Titusville, Penna.

FOR SALE

PANGBORN BLAST CLEANING ROOM

14′ x 30′

No. 612 Type "MS" with complete recovery system. "BVR-7" abrasive separator. "AQ-1" hose machine. No. 6118 Type "CH-2" dust collector. All complete with motors and controls. New late 1950. Used on one Government contract. Asking less than half new price. Available immediately.

THE WOLF COMPANY
Phone COlony 4-7913
CHAMBERSBURG, PENNSYLVANIA

WANTED

HEAT TREATING FURNACE—Continuous Rotary Retort Hardening Furnace similar to American Gas Furnace 136 or 139. Capacity 150 to 1000 lbs. per hour.

THE MELLOWES COMPANY
125 East Nash St. Milwaukee 12, Wis.

WANTED

1—18" or 20" Roll Turning Lathe, to turn 2 rolls from single or double drive.

1—18" or 20" Roll Turning Lathe, to turn rolls single.

ROTARY ELECTRIC STEEL CO.
Box 4606
Detroit 34, Michigan

DRAFTSMEN

(Architectural Metal)

Experienced in making and checking shop drawings

Our company offers excellent opportunity in permanent non-defense work.

Good wages, plus overtime, free liberal insurance, hospital and surgical benefits and pension plan.

Write S. Thom

THE FLOUR CITY ORNAMENTAL IRON CO.
2637 27th Ave. South,
Minneapolis 6, Minn., U.S.A.

If qualified, travel and moving expenses will be paid.

LARGE MACHINE AND WELDMENT CAPACITY

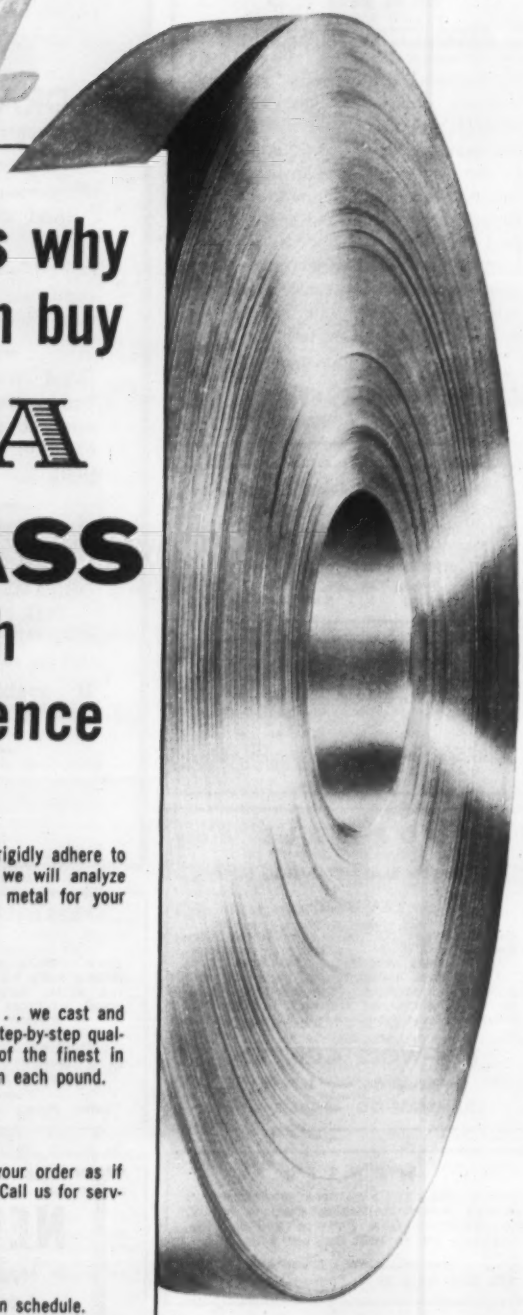
Open capacity on 24 ft. and 10 ft. Vertical Boring Mills 7", 5" and 4" Horizontal Boring Mills; large radials and supporting small machines including new 2 AC Warner & Swasey automatic chucking. Especially interested in producing weldments requiring machining.

C. H. WHEELER MANUFACTURING CO.
Sedgley Ave. at 19th & Lehigh
Philadelphia 32, Pa.
Phone: Henry Kingston—Sagamore 2-6500

1/3 OF NEW PRICE

- Hydraulic Skid Trucks
- 5,000 lb. capacity
- 3" Lift
- Platform—11"x26"x48"

SPECIAL
$185.00 each
MOBILE INDUSTRIAL EQUIPMENT CORP.
Tioga & 9th Sts. Phila. 40, Pa.



4 reasons why you can buy P&A BRASS with confidence

1

SPECIFICATIONS — We rigidly adhere to your standards . . . or we will analyze your needs and furnish metal for your specific requirements.

2

QUALITY — Consistent . . . we cast and roll our own metal; our step-by-step quality control assures you of the finest in metal plus the most from each pound.

3

SERVICE — We handle your order as if you were here in person. Call us for service — we go all out.

4

DELIVERIES — We ship on schedule.

P&A ESTABLISHED 1865

THE PLUME & ATWOOD MANUFACTURING COMPANY

THOMASTON, CONN.

N. Y. Office: 220 Broadway

300 tons, Hanford Works construction; bids in to Atomic Energy Commission, Richland, Wash.

800 tons, junior high school, No. 204, Queens, New York, bids Dec. 1.

450 tons, addition, Newtown high school, Queens, New York, bids Dec. 6.

215 tons, wide flange, low alloy, high tensile, Navy, General Stores Supply Office, Philadelphia.

185 tons, 120 tons wide flange, General Services Administration, San Francisco.

130 tons, including 65 tons steel piles, 3-span I-beam bridge, Amherst, N. H.; bids Dec. 1, Concord, N. H.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1365 tons, unit 3, flood control project, Hoosic river basin, North Adams, Mass., to Truscon Steel Division, Republic Steel Corp., Boston; Petricca Construction Co., Pittsfield, Mass., general contractor.

200 tons, high school, Andover, Mass., to Barker Steel Co., Boston; Rugo Bros. Construction Co., Boston, general contractor.

115 tons, medical building, Chattanooga, Tenn., to Connors Steel Co., Birmingham; J. A. Jones Construction Co., Atlanta, general contractor.

REINFORCING BARS PENDING

250 tons, 629-ft Oregon state bridge, Yamhill county; general contract to Hamilton & Thomas, Eugene, Oreg., low $295,150.

124 tons, tunnel lining, etc., Olympic National Forest project; bids to Bureau of Public Roads, Portland, Oreg., Dec. 6.

100 tons, also 1090 feet 72-in. government-furnished steel outlet pipe; Bureau of Reclamation project; bids to Chester, Mont., Dec. 1.

100 tons, Washington state, King county, T-beam bridge; general contract to Acme Construction Co., Eugene, Oreg., low $478,892.

PLATES . . .

PLATES PLACED

600 tons, East 115th St. 48-in. pipe line, Seattle; to Beall Pipe & Tank Corp., Portland, low $139,915.

PLATES PENDING

170 tons, 600,000-gal elevated water tank, Naval air station, Lincoln, Nebr.; bids Dec. 16.

140 tons, class B, grade 2, Watertown arsenal, Watertown, Mass.; bids Dec. 5, inv. 38.

PIPE . . .

CAST IRON PIPE PENDING

200 tons, 12,600 feet 8 and 12 in.; bids to Mabel Waterman, clerk, Moses Lake, Wash., Nov. 22.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Pennsylvania-Reading Seashore Line, 12 diesel-electric locomotives, to the Baldwin-Lima-Hamilton Corp., Eddystone, Pa.

RAILROAD CARS PLACED

Atlantic Coast Line, 1595 freight cars, with 720 hopper cars, 275 boxcars and 100 flatcars going to its own shops and 500 boxcars to ACF Industries Inc., New York.

Chesapeake & Ohio, 6000 freight cars, of which 4500 hopper cars and 500 covered hopper cars will be built at its Russell, Ky., shops and 1000 box cars to an unnamed commercial shop.

Northern Pacific, five parlor-bar-lounge cars and ten lightweight baggage cars, to the Pullman-Standard Car Mfg. Co., Chicago.

RAILROAD CARS PENDING

Southern Pacific, 10,700 freight cars, program authorized covers 6600 boxcars; 1050 flatcars, of which 250 will be designed for piggyback service; 1550 gondola cars, 1000 open hopper cars and 500 covered cars. Most of the equipment will be built in the company's own shops at Sacramento, Calif., and Houston.

Advertising Index

Alliance Machine Co., The 124
Alter Co., Alloy Metal Division 134
American Broach & Machine Co., A Division of Sundstrand Machine Tool Co. 128
American Cast Iron Pipe Co., Special Products Division 46, 47
Armco Steel Corporation 62
Associated Spring Corporation 43
Avondale Marine Ways, Inc. 116

B-G-R Cook Plant, Division of Associated Spring Corporation 43
Babcock & Wilcox Co., The, Boiler Division 26
Babcock & Wilcox Co., The, Refractories Division 108
Babcock & Wilcox Co., The, Tubular Products Division 137
Bailey, William M., Co. 113
Bakelite Co., A Division of Union Carbide & Carbon Corporation 51
Baldwin-Lima-Hamilton Corporation, Standard Steel Works Division 49
Barnes-Gibson-Raymond, Division of Associated Spring Corporation 43
Barnes, Wallace, Co., Division of Associated Spring Corporation 43
Barnes, Wallace, Co., Ltd., The, Division of Associated Spring Corporation 43
Bethlehem Steel Co. 1, 168
Bishop, J., & Co. Platinum Works 131
Bliss, E. W., Co., Mackintosh-Hemphill Division 95
Bridgeport Brass Co. 139
Buhr Machine Tool Co. 89
Bullard Co., The 78
By-Products Steel Co., A Division of Lukens Steel Co. 157

Carborundum Co., The, Refractories Division 105
Carlson, G. O., Inc. 30
Carpenter Steel Co., The 15
Cattie, Joseph P., & Brothers, Inc. 158
Century Electric Co. 7
Chambersburg Engineering Co. 50
Cincinnati Shaper Co., The 25
Cleveland Hotel 161
Cleveland Worm & Gear Co., The ..... Inside Back Cover
Climax Molybdenum Co. 52
Colorado Fuel & Iron Corporation, The 55, 110, 111
Columbia-Geneva Steel Division, United States Steel Corporation 17, 20
Copperweld Steel Co., Steel Division 81
Crocker-Wheeler Division, Elliott Co. 8, 9
Custom Die Co. 84
Cutler-Hammer, Inc. ..... Back Cover

Danly Machine Specialties, Inc. 132, 133
Denison Engineering Co., The 54
Diamond Manufacturing Co. 158
Dodge Manufacturing Corporation 44
Drop Forging Association 159
Dunbar Brothers Co., Division of Associated Spring Corporation 43

Eastern Machine Screw Corporation, The 158
Elastic Stop Nut Corporation of America 31
Electric Controller & Mfg. Co., The ..... Inside Front Cover
Elliott Co., Crocker-Wheeler Division 8, 9

Flour City Ornamental Iron Co., The 165
Frasse, Peter A., & Co., Inc. 13
Freeway Washer & Stamping Co. 158

General Electric Co. 32, 33
Gerrard Steel Strapping Division, United States Steel Corporation 45
Gibson, William D., Co., The, Division of Associated Spring Corporation 43
Globe Brick Co., The 130
Goodyear Tire & Rubber Co., Inc., The, Industrial Products Division 4
Gregory Industries, Inc., Nelson Stud Welding Division 154, 155

Heresite & Chemical Co. 148
Hyde Park Foundry & Machine Co. 167

Ingalls Iron Works Co., The 153

Johns-Manville 56
Jones & Laughlin Steel Corporation 91

Kaiser Aluminum & Chemical Sales, Inc., Kaiser Chemicals Division 14
Kennametal, Inc. 34
Koppers Co., Inc., Tar Products Division 120

Laminated Shim Co., Stampings Division 10
La Salle Steel Co. 22, 23
Leschen Wire Rope Division, H. K. Porter Company, Inc. 27
Lindberg Engineering Co. 36
Lovejoy Flexible Coupling Co. 16
Lukens Steel Co. 24
Lukens Steel Co., By-Products Steel Co. Division 157
Luria Brothers & Co., Inc. 163

McKay Machine Co., The 73
McLouth Steel Corporation 151

Mackintosh-Hemphill Division of E. W. Bliss Co. 95
Macwhyte Co. 3
Manheim Manufacturing & Belting Co. 92
Manross, F. N., & Sons Co., Division of Associated Spring Corporation 43
Metal & Thermit Corporation, United Chromium Division 61
Milwaukee Division of Associated Spring Corporation 43

National Acme Co., The 12
National Steel Corporation 129
Nelson Stud Welding Division of Gregory Industries, Inc. 154, 155
Nice Ball Bearing Co. 158
Northeastern Boiler & Welding, Ltd. 161

Ohio Division of Associated Spring Corporation 43

Pennsylvania Salt Manufacturing Co. 21
Plume & Atwood Manufacturing Co., The 166
Pope Machinery Corporation 150
Porter, H. K., Company, Inc., Leschen Wire Rope Division 27
Potter & Johnston Co., Subsidiary of Pratt & Whitney Co., Inc. 74

Raymond Manufacturing Co., Division of Associated Spring Corporation 43
Republic Steel Corporation 118, 119
Reynolds Metals Co. 121, 122
Robbins & Myers, Inc. 42
Roebling's, John A., Sons Corporation, A Subsidiary of The Colorado Fuel & Iron Corporation 55
Rotary Electric Steel Co. 96, 165
Ryerson, Joseph T., & Son, Inc. 64

Seaboard Coil Spring Division of Associated Spring Corporation 43
Simmons Machine Tool Corporation 6
SKF Industries, Inc. 2
Smith, Barney & Co. 160
Somers Brass Co., Inc. 85
Square D Co. 29
Standard Pressed Steel Co. 48
Standard Steel Works Division, Baldwin-Lima-Hamilton Corporation 49
Sundstrand Machine Tool Co., American Broach & Machine Co. Division 128
Surface Combustion Corporation 40, 41

Teiner, Roland, Co., Inc. 5
Tennessee Coal & Iron Division, United States Steel Corporation 17, 20
Texas Co., The 58
Thomas Machine Manufacturing Co. 152
Timken Roller Bearing Co., The, Steel & Tube Division 82
Tinnerman Products, Inc. 86
Titan Metal Manufacturing Co. 37
Townsend Co. 141

Union Carbide & Carbon Corporation, Bakelite Co. 51
Union Wire Rope Corporation 57
United Chromium Division, Metal & Thermit Corporation 61
United Engineering & Foundry Co. 127
United States Rubber Co., Mechanical Goods Division 39
United States Steel Corporation, Subsidiaries 17, 18, 19, 20, 45
United States Steel Export Co. 17, 20
United States Steel Supply Division, United States Steel Corporation 17, 20
Universal-Cyclops Steel Corporation 165

Waterbury Farrel Foundry & Machine Co. 123
Wean Engineering Co., Inc., The 11
Weirton Steel Co. 129
Wheelabrator Corporation 38
Wheeler, C. H., Manufacturing Co. 165
Wickwire Spencer Steel Division of The Colorado Fuel & Iron Corporation 110, 111
Williams-White & Co. 53
Wolf Co., The 165

Youngstown Foundry & Machine Co., The 35
Youngstown Sheet & Tube Co., The 28

Table of Contents, Page 5

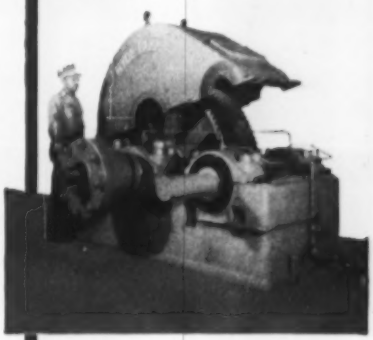
Classified Advertising, Page 165

Hyde Park

RED CIRCLE Rolls ALLOY-CHILLED

Gray Iron Castings

Hyde Park Castings up to 80,000 pounds are sound, accurate and physically dependable.
Precision machining is done by skilled craftsmen in our modern machine shop.
Send your blue prints for quotation.



Mill Drive

Machine Castings
Lathe Beds
Housings
Pinion Housings
Mill Housings
Shoe Plates
Layout Plates
Surface Plates

For finer finish, long life and greater tonnage, specify Red Circle Rolls.

Hyde Park
FOUNDRY & MACHINE CO.
Hyde Park, Westmoreland County, Pa
ROLLS
ROLLING MILL MACHINERY
GREY IRON CASTINGS

He's shooting for perfection

This earnest young man is intent on turning out a perfect sheave. From the looks of the job, we'd say his chances are fine. Best-looking sheave wheel we've seen in quite a while.

He has done his machining with great care, and with complete confidence. That confidence is warranted, for the wheel was first a Bethlehem steel blank, made by Bethlehem's forging-and-rolling process.

If you've never seen this method of manufacture, let us explain it briefly. It employs a mill that is the only one of its kind in the entire country. Blanks are not just forged, not just rolled, but *both* — in a single operation that produces high strength and very desirable grain flow.

That high strength is important. Equally important is the way the blanks machine. In the customer's shop, machinists can do their job with assurance, knowing that the metal underneath is as firm and "sweet" as that on top.

Bethlehem forged-and-rolled blanks are available for a long list of applications, including spur, bevel, miter, and other types of gears; crane and sheave wheels; turbine rotors, clutch drums, brake drums, flywheels, pipe flanges, and numerous others. You can obtain the blanks in sizes from 10 to 42 in. OD, untreated or heat-treated. For full details, ask for Booklet 216; it will be sent to you promptly.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

Rated at 139 HP, Class 1 service, at 450 RPM—housings for these king-size Clevelands are of welded steel construction with gear shafts extending on both sides. Clevelands can be built to fit any requirement, large or small.

Giant CLEVELANDS for Mesta rope transfer drives

CLEVELAND Worm Gear Speed Reducers can be king-size, too. Here are two of six units, with 36" center distance built recently for the Mesta Machine Company of Pittsburgh, Pennsylvania. These giant drives are being placed in service at a steel company as rope transfer drives in the beam mill.

Mesta continues to choose Clevelands because they know from long experience that they perform well under heavy duty steel mill service. They transmit power uniformly and smoothly. Unvarying efficiency stems from Cleveland's case-hardened steel worms which run in perfect mesh with nickel-bronze gears. And, this is a combination that actually improves with use—proven by record in hundreds of instances.

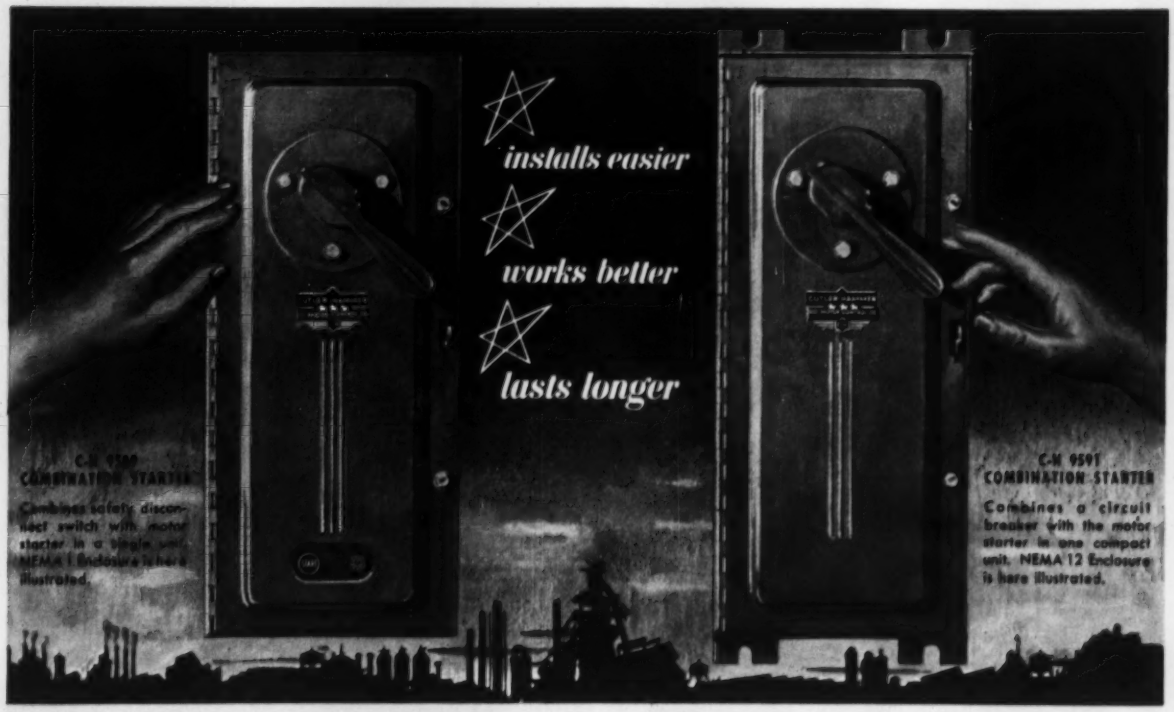
Learn more about the advantages Clevelands have to offer—write today for free Catalog 400. The Cleveland Worm and Gear Company, 3270 East 80th Street, Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.

CLEVELAND
Worm Gear
Speed Reducers

WHAT'S NEW IN MOTOR CONTROL? ★ ★ ★ GET IT FIRST IN CUTLER-HAMMER

New Cutler-Hammer Three-Star Combination Starters offer industry important new economies


installs easier
works better
lasts longer
C-H 9591
COMBINATION STARTER
Combines a circuit breaker with the motor starter in one compact unit. NEMA 12 Enclosure is here illustrated.

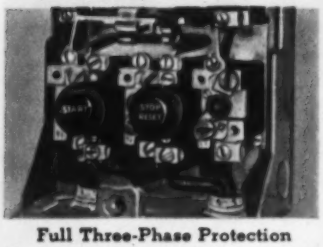
Convenience and economy are basic advantages of combination starters. Users everywhere say the new Cutler-Hammer ★ ★ ★ Combination Starters bring these basic advantages to new high levels of importance. Contact life is so amazingly improved that maintenance care is *never* needed in all normal uses. Adjustable load sensing coils permit motors to work at top capacity without hazard to provide maximum production without needless work interruptions. And the widely praised Cutler-Hammer exclusive, full three-phase overload protection in standard combination starters, is optional at slight additional cost.

The three silver stars stand for three new standards

CUTLER-HAMMER
MOTOR CONTROL
C-H

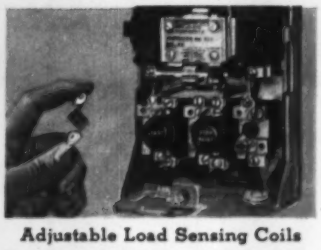
Compare the performance and economies of these remarkable new Cutler-Hammer Three-Star Combination Starters with any you have ever known. Cutler-Hammer Bulletin 9589 Combination Starters incorporate rugged disconnect switches of advanced design (fused or unfused). Cutler-Hammer Bulletin 9591 Combination Starters are equipped with circuit breakers. Your nearby Cutler-Hammer Authorized Distributor is stocked and ready to serve you. Order from him today.

CUTLER-HAMMER, Inc., 1211 St. Paul Avenue, Milwaukee 1, Wisconsin.



Full Three-Phase Protection

Only *three* overload relays can give complete three-phase protection to avoid motor burn-outs and their costly interruptions to production. And *only* Cutler-Hammer offers this complete three-phase protection in standard combination starters. You pay only for the third relay, nothing extra for special engineering or special enclosures.



Adjustable Load Sensing Coils

The accurate adjustment of overload protection permits motors to work harder without damage to motor windings. This is more important than ever with the newer type small frame motors. Adjustable load sensing coils in these new starters provide 3% loading accuracy instead of the 10% to 12% accuracy in competitive control.

Superlife Vertical Contacts

Experienced control users insist on dust-safe vertical contacts. And now the famous Cutler-Hammer vertical contacts have been doubly improved. First, their new lightweight design cuts bounce to reduce arcing. Second, any arcing that might occur is now pressure-quenched. Compare performance and see the difference.